Configuration Tool ETM9xxx (x) - USER GUIDE

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- If the modem is in LPM (sleep) mode and an input changes state the modem will wait at least 60 seconds before it wakes up and then at least another 60 seconds before it will actually send the alert. BUT if the input returns to the original (non-alert) state before the second 60 seconds has elapsed then it is possible that the alert will not be sent. This is a result of the change from LPM to normal operation and cannot be made to operate in a different way. 32

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1. Document Life

1.1. History

1.1.1. Rev:04.08.02

Date of issue: Monday 16th August 2010

Issued by: Tony Kay

Information:

Temporary release issue for CT04.08.02

1.1.2. Rev: 04.10.00

Date of issue: Monday 27th August

Issued by: Tony Kay

Information:

Final release issue for CT 04.10.00

1.1.3. Rev: 04.11.00

Date of issue: Not issued

Issued by: NA

Information:Debug Version – Testing only

Testing verision for following CT 04.12.00

1.1.4. Rev: 04.12.00

Date of issue: Friday, 3 December 2010

Issued by: Tony Kay

Information:

Final release issue for CT 04.12.00

2. Software Versions

2.1. History

2.1.1. Etm9910 SW991B070R03 20100707 CT0408

Date of issue: 7th July 2010

Information:

Temporary release candidate

2.1.2. All hardware releases

Etm9570 SW911B024R01 20100920 CT0410

Etm9570B SW921B024R01 20100920 CT0410

Etm9910 SW912B024R01 20100920 CT0410

Etm9910B SW922B024R01 20100920 CT0410

Date of issue: 20th August 2010

Information:

Withheld release candidate

2.1.3. All hardware releases

Etm9570 SW912B041R01 20101201 CT0412

Etm9570B SW912B041R01 20101201 CT0412

Etm9910 SW912B041R01 20101201 CT0412

Etm9910B SW912B041R01 20101201 CT0412

Date of issue: Friday, 3 December 2010

Information:

Final release candidate

3. Formatting of this document

3.1. Where the individual numbered point (such as 10.10.1.1) has the first line **bolded** the information relates specifically to an option within the Configuration Tool

3.2. Where any information is red (such a a NOTE:) this will not relate specifically to an option within the Configuration Tool as is instead meant as information only.

3.3. Where any information is **red and bolded** (such as a **NOTE:**) this will relate specifically to an option within the Configuration Tool.

3.4. Section headers (such as **3. Formatting of this document**) identify either a tab within the configuration tool or information that is relevant to the product but do not point specifically to any individual option.

4. Relevant Documents

4.1. The appendices and documents listed below are useful for the understanding of this document.

Ref.	Document no.	Title.
1		ETM9xxx ET communication specification
2		ETM9xxx TCP UDP Port configuration spec
3	AN0081	Control the Network/Stack in an ETM Modem

5. Abbreviations

5.1. The following abbreviations may be helpful when reading this document;

EEPROM	Electrical Erasable Program Read Only Memory
UART	Universal Asynchronously Receive Transmit
CR	Carriage Return
LF	Line Feed
CT	Configuration Tool
MCU	Microcontroller
RTC	Real Time Clock
RD	Reference Date
BPS	Bits per second
WIRELESS MODEM	957x *OR* 99xx
GSM/GPRS/UMTS/HSDPA	Wireless

6. Modem Introduction

6.1. This document describes the operation of multiple ETM Pacific Pty Ltd wireless modems and therefore within this document multiple types of product are refered to with the generic term of 'wireless modem' and wherever there is a distinction required between the various modems a clearly identified header will be shown for each type of product;

6.2. ETM 957x

6.2.1. The ETM957x wireless modem contains a GSM/GPRS module with an added microcontroller interface, which can be configured to control outputs and read inputs. The GSM/GPRS module, which is a Cinterion TC63i device, uses AT commands to facilitate general operations.

6.2.2. **This document refers to GSM/GPRS by the generic term 'wireless' and so you should *remember that the ETM 957x wireless modem cannot access UMTS/HSDPA services.***

6.3. ETM 99xx

6.3.1. The ETM99xx wireless modem contains a GSM/GPRS/UMTS/HSDPA module with an added microcontroller interface, which can be configurable to control outputs and read inputs. The GSM/GPRS/UMTS/HSDPA module, which is a Cinterion EU3-P device, uses AT commands to facilitate general operations.

6.3.2. **This document refers to GSM/GPRS/UMTS/HSDPA by the generic term 'wireless' and so you should *remember that the ETM 99xx wireless modem can access GSM/GPRS/UMTS/HSDPA services.***

6.4. All wireless modems

6.4.1. The wireless modem is equipped with an EEPROM that is programmed with an application image supporting the required operation and functions of the wireless modem.

6.4.2. The data configured within the EEPROM is for alarm messages, telephone numbers, port input and output status, baud rate, id numbers and user passwords.

7. Configuration Tool Installation

7.1. Installation / Removal

7.1.1. The Configuration Tools can be copied to any folder on the PC's hard drive. It consists of only one file and does not need to be installed. You can simply delete the Configuration Tool executable and the ini file it creates if you want to remove it from your machine.

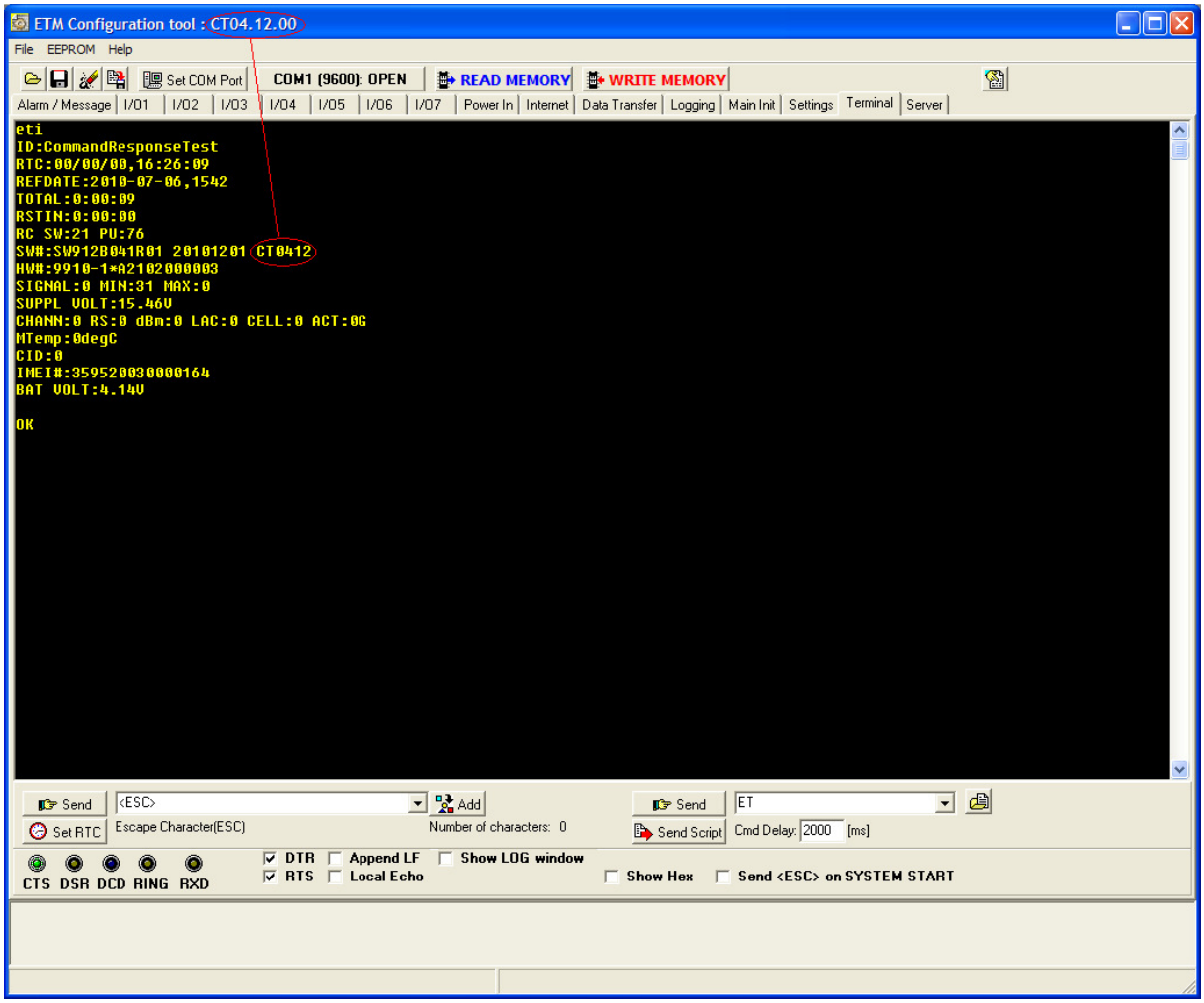
7.1.2. If you delete the Configuration Tool and you have saved any configurations (to etx files) remember to archive any that you require in the future before completing the deletion.

7.1.3. The wireless modem should be connected to the PC with a standard 9 pin serial (pc to modem) cable.

7.2. Normal Usage

7.2.1. Depending on your use of the Configuration Tool there may (over a period of time) be wireless modem configuration files, with an etx extension, created and these files can be saved in any location that you have choosen. The tool itself will create a single ini file which must be left in the same directory as the Configuration Tool for continued operation of the tool.

8. Use the configuration tool to configure the modem



8.1. When you power up the wireless modem to do any configuration you **MUST** follow these steps if you are unfamilliar with the operation of the Configuration Tool;

8.1.1. Start the configuration tool.

8.1.2. Chose the correct communications port (using the Set COMM Port button to select a port other than the one chosen by the Configuration Tool) – leave every setting other than the actual port as they are.

8.1.3. Confirm that the port opens (the indicator **MUST** show ‘OPEN’ for your chosen port) by clicking on the com port button if it displays ‘COMx: CLOSED’.

8.1.4. Click on the Terminal Tab.

8.1.5. Click into the black terminal window so that you see a flashing white cursor.

8.1.6. Power up the wireless modem - remember to plug the power into the correct socket, it is the one next to the antenna lead, plugging the power connector into the I/O connector can damage it, if this happens you may need to return the wireless modem for repair.

8.1.7. Immediately after powering up press the ESC key on the keyboard, you should only need to press it 3 or 4 times, and after a short period you should see an 'Escape Pressed' message from the wireless modem – if you don't and instead you see a 'MS:^SYSSTART' message then repeat the process again. Without the 'Escape Pressed' message being displayed you **CANNOT** perform any configuration on the wireless modem (while it is possible to use the Configuration Tool once the wireless modem has fully started up this may not be possible if the wireless modem has not yet been fully configured).

NOTE: You can also check 'Send <ESC> on SYSTEM START' (which will cause the Configuration Tool to automatically send an ESC character when it sees the SYSTEM START message) in the bottom right hand corner of the Configuration Tool but this doesn't work with some USB to Serial adapters – if you check this remember to uncheck it again when you restart the modem after any programming changes otherwise you may inadvertently leave the modem in programming mode rather than run mode.

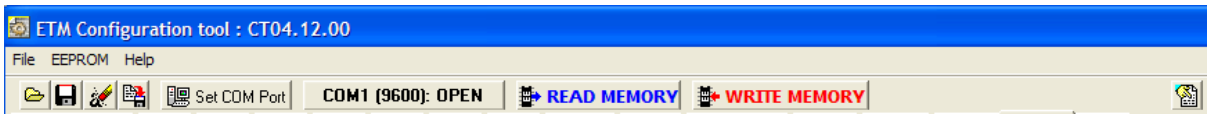
8.1.8. Make sure that the version of CT shown in the caption bar of the Configuration Tool and the verison of the firmware shown on the end of the line ending 'CTxxxx' matches – you don't have to worry about the minor version number…. CT04.10.00 will work for all versions of firmware that show CT4.08. Using the wrong version tool can cause the wireless modem to perform in an unexpected manner resulting in in correct operation of the modem.

8.1.9. You are now ready to use the configuration tool to make changes to the wireless modem.

8.2. Once you are familiar with the Configuraiton Tool you can shorthen the procedure if the wireless modem is already live/working by simply reading and writing the configuration without restarting the wireless modem then pressing the ESC key.

Note: If any changes are made to the modem you should power cycle or software reset (ET&SR) the modem to ensure that so that any new mode of operation (based on your configuration changes) comes into effect. If you make no changes, only reading the configuration, you do not need to restart the modem.

9. Saving, reading and writing configuration files



9.1. Select “File – Open” (or use the button) to open an existing configuration file.

9.2. Select “File – Save” (or use the button) to save a configuration file after you have read an existing configuration from a wireless modem or when you have manually entered a configuration.

9.3. To read the current settings of the wireless modem by choosing “EEPROM – ReadEEPROM” (or use the button)

9.4. The configuration tool’s current settings can be written to the wireless modem by choosing “EEPROM – WriteEEPROM” (or use the button).

Note: You cannot perform a write operation if you have not opened an existing configuration file or performed a read operation.

NOTE: Once you have written any changes to the modem you should always power cycle or software reset (ET&SR) the modem so that any new mode of operation (based on your configuration changes) comes into effect.

9.5. If you need to open a communications port other than the one chosen by the Configuration Tool use the button.

9.6. can be used to control whether or not the communications port is opened (You must have the communications port open to connect in any way to the wireless modem).

9.7. This allows you to leave the configuration tool open but not connected to the serial port in case you need to use another communications application such as HyperTerminal©

9.8. The ‘pointing finger’ button will reload the configuration tool with a default configuration (which will do nothing more than set the modem up as a blank modem ready for you to configure) and is there in case you want to start a fresh configuration. Remember, you need

to 'File – WriteEEPROM" (or use the

button)' after you do any configuration changes within the tool otherwise your changes will be lost.

9.9. The selected baud rate for the COM port is displayed in brackets when the port is opened.

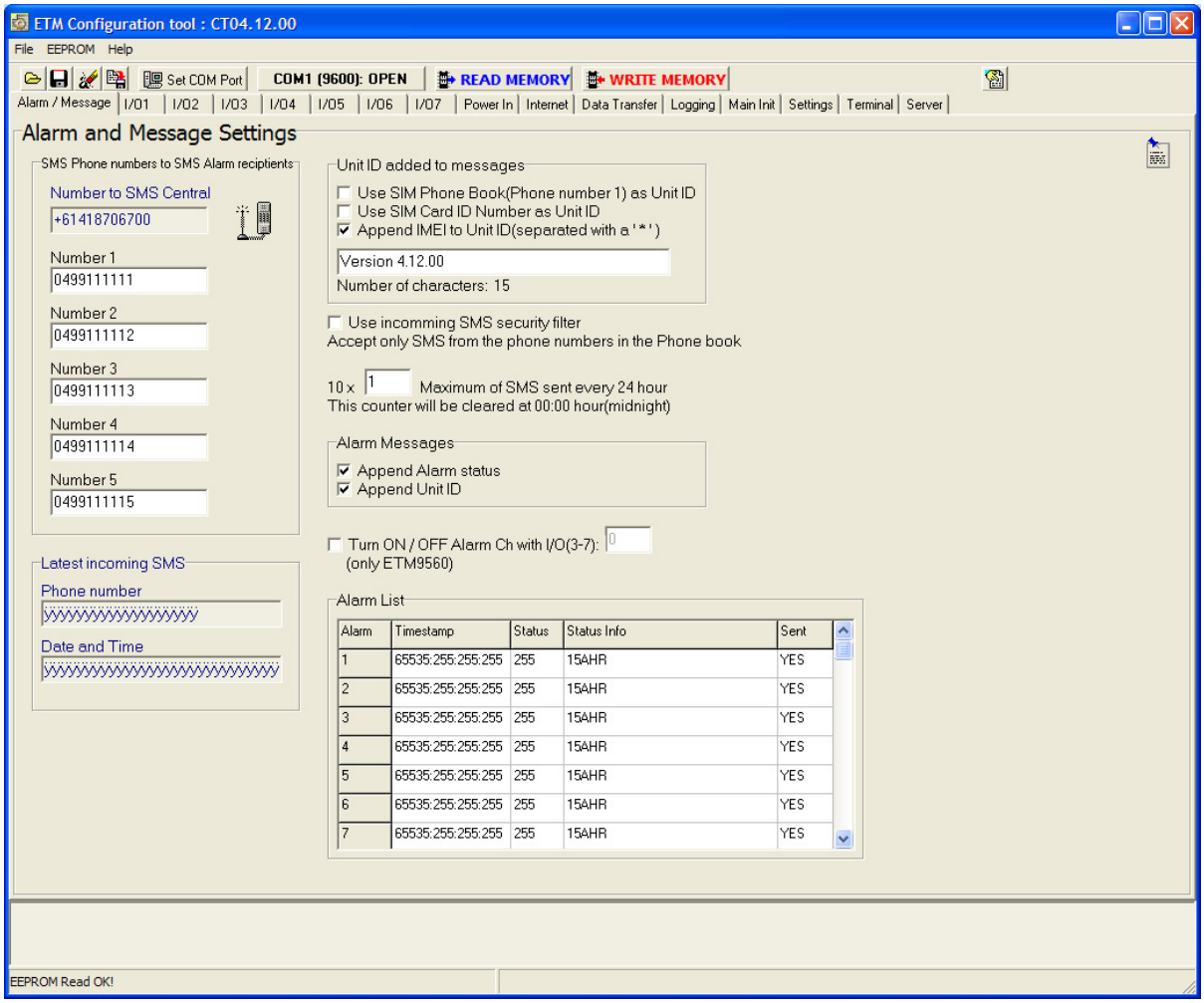
9.10. Note: When reading or writing the unit may be busy and a read or write may fail in this case a popup will inform you of the error. You can retry the read or write but if it continues to fail follow the steps to access the configuration screen then make make your changes again.

9.11. Don't forget…. Restart the modem after any changes are made, OR if you have put the modem into programming mode using the ESC key at startup.

10. Alarm / Message Tab

10.1. The unit can send messages based on inputs to up to 5 destinations.

Note: Some carriers offer the ability to send SMS messages to a home phone number (which is converted by text-to-speech) but the format of an outbound SMS (from a wireless modem) can be a mix of alpha-numeric characters which can result in very hard to understand voice messages – there is no option to change the formatting of the outbound SMS messages.


ETM Configuration tool : CT04.12.00
File EEPROM Help
Set COM Port
COM1 (9600): OPEN
READ MEMORY
WRITE MEMORY
Alarm / Message | I/O1 | I/O2 | I/O3 | I/O4 | I/O5 | I/O6 | I/O7 | Power In | Internet | Data Transfer | Logging | Main Init | Settings | Terminal | Server
Alarm and Message Settings
SMS Phone numbers to SMS Alarm recipients
Number to SMS Central
+61418706700
Number 1
0499111111
Number 2
0499111112
Number 3
0499111113
Number 4
0499111114
Number 5
0499111115
Latest incoming SMS
Phone number
Date and Time
Unit ID added to messages
Use SIM Phone Book(Phone number 1) as Unit ID
Use SIM Card ID Number as Unit ID
Append IMEI to Unit ID(separated with a '*')
Version 4.12.00
Number of characters: 15
Use incomming SMS security filter
Accept only SMS from the phone numbers in the Phone book
10 x 1 Maximum of SMS sent every 24 hour
This counter will be cleared at 00:00 hour(midnight)
Alarm Messages
Append Alarm status
Append Unit ID
Turn ON / OFF Alarm Ch with I/O(3-7): 0
(only ETM9560)
Alarm List
Alarm | Timestamp | Status | Status Info | Sent
1 | 65535:255:255:255 | 255 | 15AHR | YES
2 | 65535:255:255:255 | 255 | 15AHR | YES
3 | 65535:255:255:255 | 255 | 15AHR | YES
4 | 65535:255:255:255 | 255 | 15AHR | YES
5 | 65535:255:255:255 | 255 | 15AHR | YES
6 | 65535:255:255:255 | 255 | 15AHR | YES
7 | 65535:255:255:255 | 255 | 15AHR | YES
EEPROM Read OK!

10.2. SMS phone numbers to SMS Alarm recipients

10.2.1. The SMS Central information is taken from the SIM and cannot be changed.

10.2.2. Numbers 1 – 5 list the recipients of the alarm messages, i.e. 0499xxxxxx

10.3. Latest Incoming SMS

10.3.1. **Phone Number** shows the last number to send a valid message to the wireless modem.

10.3.2. **Date and Time** shows when the last valid message was received.

Note: You can use these two entries to determine if there is a problem sending SMSs to the wireless modem…. If you don't see your SMS displayed it may be because your SMS is not being delivered or because of an SMS formatting issue.

SMS formatting issues will affect you if you use a phone to send an SMS that has extra characters inserted. As an example one type of phone will insert a variable line of dashes at the top and bottom of an SMS and the wireless modem cannot then determine where, within the SMS, the real content starts and so the SMS is rejected.

To diagnose whether or not the SMS has formatting issue you can send a test message from your phone to a different type of phone and see if there are extra characters OR call your distributor and they may be able to give you a test number to send to and they could then let you know whether the content and format of your messages are acceptable.

10.4. Unit ID added to messages

10.4.1. **Use SIM Phone Book (Phone number 1) as User ID** when checked will set the UnitID of the unit to be whatever phone number is configured in that slot.

Note: This does not change the number from which any SMS is sent – it simply identifies the wireless modem in the text area of any data sent.

10.4.2. **Use SIM Card ID as User ID** when checked will cause the UnitID of the wireless module to be set to the ID of the SIM.

Note: See note above about the ID

10.4.3. **Append IMEI to Unit ID (separated with a '*')**

10.4.3.1. If this option is checked then the IMEI of the module within the modem will be appended to the configured Unit ID to further identify the data being sent.

This option will help identify data in the following scenerio;

- You replace a modem configured as'1234' in the field with a new modem (and call it '1234')

- You confirm that the replacement wireless modem is sending data
- You return the original wireless modem to your support team for updating
- The support team accidentaly power up the modem and leave it working while they have lunch
- The original modem, still called '1234', sends invalid data during this time (because it has no inputs connected) while your new modem continues to send valid data
- Your TCP (or UDP) receivers combine the data from the new and original modem and now you have a mess in your database that you may struggle to sort out

.

10.4.3.2. When checked the normal Unit ID of '1234' becomes '1234*6767856543787563' (as an example) and the IMEI, because it is unique to each modem, will allow you to correctly identify data from any wireless modem and if the IMEI does not match what you are expecting then you can discard it (archiving it for later use if required)

10.4.3.3. Even thought the screen capture above shows the option checked you would generally only check this option if you are sending data using one of the '#x' send methods outlined in Internet Data Transfer mode.

10.4.4. **Manually entered UnitID –** The text entry area

10.4.4.1. If you want to enter a textual ID then enter it into the text entry area and uncheck the two checkboxes above.

10.4.4.2. You have forty (40) characters available and we suggest that you use the shortest practical ID possible as there are only 160 characters available in an SMS and if you use 40 characters for the ID this leaves only 120 characters for the content of the SMS which may limit the information that can be sent.

10.4.5. When entering a specific ID you should not use punctuation characters – to guarantee that you don't affect the field positioning of any data being sent by the wireless modem you should never use a comma in the **Unit ID**. If you have a comma in the Unit ID you will effectivly add a new field to any data sent as the data is delimited with commas by default.

Example: If you make the UserID;

100 Bridge Road, Pump

… instead of 100 Bridge Road Pump then when the data is sent to the internet it will come out as;

#21,1,100 Bridge Road, Pump,1,162102,1,1,1162100,4294967295,,,,,,,<CR><LF>

… instead of;

#21,1,100 Bridge Road Pump,1,162102,1,1,1162100,4294967295,,,,,,,<CR><LF>

… with the result that there is now one more field in the data than there should be and any process designed to automatically handle the data will not correctly parse the data.

10.5. Use incoming security filter

10.5.1. You may restrict the users, sending SMS messages, that can access the unit to the control configurable options or to return current statuses by selecting “Use incoming SMS security filter”.

10.5.2. Once this option is checked only numbers defined in one of the five positions in the recipient list will receive a response to queries or be allowed to change configuration options… all other senders will simply be ignored and their SMS messages deleted.

10.5.3. This list is not used when an incoming CSD call is received.

NOTE: The ability to receive a CSD call is described here.

10.6. Maximum number of SMSs per day allowed to be sent

10.6.1. To prevent a large number of SMSs being sent due to an invalid configuration or an unstable input/system state you can limit the maximum SMSs sent in a single 24 hour period. This 24 hour period starts at the time the wireless modem is powered.

See the Delay description and Alarm Restore Delay description (within the individual I/Os) for other ways to limit invalid sending.

10.6.2. If the wireless modem exceeds the maximum allowed SMSs in a single 24 hour period then any alert that is triggered will still generate a message to the serial port (and will send a TCP or UDP alert if configured) but no SMS messages will be sent until the current 24 hour period expires. There is no indication available of when the

current 24 hour period expires.

10.6.3. To reset the maximum counter to zero send;

ET-SCC

… to the wireless modem (Serial / SMS / TCP / UDP where applicable).

10.7. Alarm Messages

10.7.1. Append Alarm status allows you to chose whether or not to add the status (High or Low) to the alert message – by default you would normally enable this.

10.7.2. Append Unit ID allows you to choose whether or not to add the Unit Id to the alert message.

10.8. ETM 9570x only: Turn ON/OFF Alarm Ch with I/O (3-7)

10.8.1. When checked, and a digital enabled is entered, alerts will only be triggered when the entered input is HIGH.

This allows one input to act as the master control for all alerting.

10.9. European market only: Alarm List

10.9.1. This feature is currently not offered for the Australian market.

11. I/O Settings

11.1. Digital Outputs

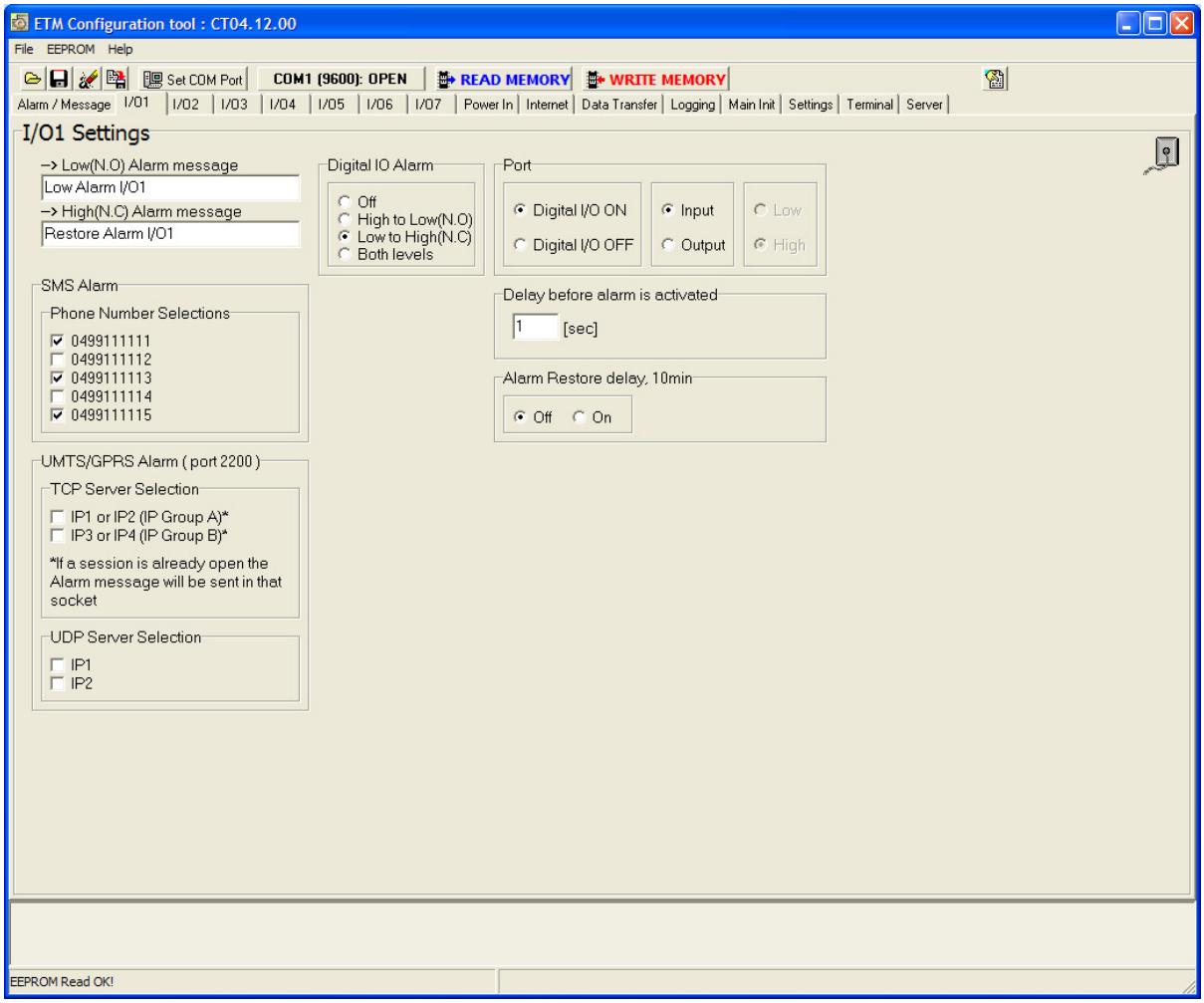
11.1.1. The I/O can be configured as an output and with the default (starting) state as either a HIGH or LOW level.

11.1.2. When the I/O is configured as an output the drive current is very limited, to drive anything other than a digital input you need a circuit similar to this to deliver a higher current.

11.1.3. If you draw too much current from an I/O you risk damaging the I/O and the wireless modem will then need to be returned to ETM Pacific for repair or replacement at your cost.

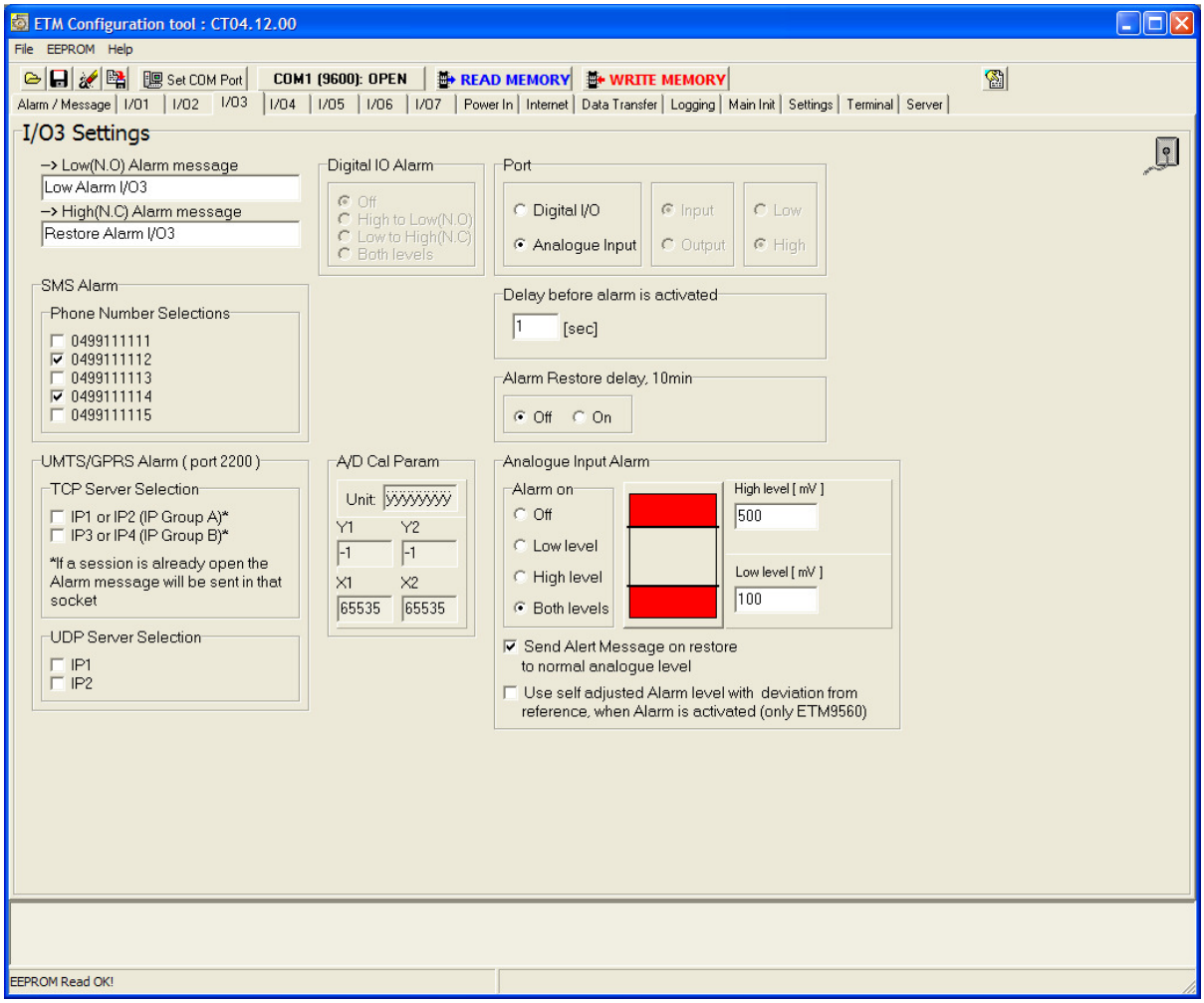
11.2. Digital Inputs

11.2.1. The configuration tool clearly shows which I/Os can function as digital inputs;



11.3. Analogue Inputs

11.3.1. The configuration tool clearly shows which I/Os can function as analogue inputs



11.4. Input specifics

11.4.1. There are 7 I/O ports, I/O 1, I/O 2 and I/O 3 are either a digital I/Os or pulse counters (further details are available in the logging section), I/O 3 to I/O 7 can be set to analogue or digital I/O in any combination.

I/O 2 as a pulse counter input is named I/O8 in the logging page

I/O 3 as a pulse counter input is named I/O9 in the logging page

11.4.2. When used as pulse counters I/O 1, I/O 2 and I/O 3 (Counter 1, 8 and 9 respectively) there are no available configuration options and the data is only available for review from the serial port using the ET&P command, from an SMS using the ET&P command OR when sent as part of the #21/#22 data by TCP or UDP (requires that the 9910 be configured to use internet sending).

11.5. Low (N.O.) Alarm Message or High (N.C.) Alarm Message

11.5.1. Specify a text that is sent with the alarm message, this makes it easy to create and use descriptive messages for each alarm.

You can enter a specific message for the normally open (NO) and normally closed (NC) state changes.

You are limited to 31 characters for each state message.

11.6. SMS Alarm

11.6.1. The phone numbers listed are taken from the “Alarm / Message” settings.

Select the numbers you want to notify in an event of alarm.

You do not have to select all destinations - this allows you to send alerts only as required.

11.7. UMTS/GPRS Alarm (Port 2200) - GPRS only if 9570

11.7.1. The unit can send alarm messages over wireless to an IP-address. **IP1** / **IP2** and **IP3** / **IP4** are set in the “Internet Data” settings tab described in the Internet Data section.

11.7.2. When using TCP only one destination group can be used. If a socket is not open the wireless modem will establish a new socket, send the alarm and then close the socket.

11.8. Digital I/O Alarm

11.8.1. Depending on your application you may set the alarm to trigger on different events.

11.8.2. You can trigger on the following state changes;

- **High to Low**
- **Low to High**
- **Both** (High to Low AND Low to High)

Any input configured as a digital input is tied high (+2.5v), with a high impedance resistor, and this is considered to be a High (NO) state and when the input is connected to 0v (pin 8 on the RJ) the input is considered to be a Low (NC) state.

11.8.3. During Low Power Mode operation a change on a configured I/O that would normally cause an alert to occur will cause the unit to wake up, the IOs are scanned

every minute and will require at least one subsequent scan to trigger.

11.9. **Port** (Digital checked)

11.9.1. I/O 1 and I/O 2 can only be set as digital I/O – they cannot be configued as an Analogue input.

11.9.2. If the I/O is set to Output the state of the I/O can be changed by serial, SMS or IP. As an example to set the state high on I/O 1 you (or and automated application/script) would send "ETS(1:DO=1)" – without the double quotes. For information about ET commands see document *ETM9xxx ET communication specifications*

11.9.3. If the port is set up as Output you may set the initial state by selecting Low/High

11.9.4. Checking 'Digital I/O Off' is the same as checking 'Digital I/O Alarm – Off' so in normal usage you would leave 'Digital I/O On' checked.

11.10. **Port** (Analogue checked)

11.10.1. I/O 3 to I/O 7 can be set as digital I/O or analogue I/O.

11.10.2. Depending on your application you may set the alarm to trigger on different events.

11.10.3. You can trigger on the following triggers;

- **High**
- **Low**
- **Both**

Any input configured as an analogue input is tied high (+2.5v), with a high impedance resistor, when the client device generates a voltage the lower impedence of the client device overrides the generated high from the modem and the true voltage can then be detected by the modem.

If you have an equally high impedence voltage generator there is a chance that the modem will not successfully detect voltage changes – if this happens please contact ETM Pacific support.

11.10.4. **Alarm on** is essentially configured the same way as the Digital I/O Alarm with the distinction being that the trigger levels for the determination of an alarm state is set by entering the High Level mV and Low Level mV values – where appropriate for your chosen state detection.

11.10.5. During Low Power Mode operation a change on a configured I/O that would normally cause an alert to occur will cause the unit to wake up, the IOs are scanned every minute (and is dependant on the 'Analogue Alarm Check Period' in the Main Init tab) and require at least one more scan interval to trigger in Low Power Mode.

11.11. Delay before alarm is activated

11.11.1. In order to prevent a noisy input triggering an alarm you can set a delay after which the alarm is triggered.

11.11.2. This means that the signal must have changed for at least the time period configured before the alarm is triggered.

11.11.3. The periods are not cumulative so if you have the input configured to trigger at 10 seconds and the input is only triggered for 9 seconds and then released the alarm will only activate with another 10 continuous seconds of triggered input.

11.11.4. Entering a value of 0 can cause the wireless modem to potentially report multiple triggers if the trigger 'bounces' more than the internal debounce circuit can handle so we do not recommend that a value of 0 be used.

11.11.5. The permissable range of values that can be entered is 0 to 3600 (0 seconds to 1 hour).

11.12. Alarm Restore Delay

11.12.1. If this option is enabled then any second or subsequent trigger that occurs will not cause an alarm SMS (or data transmission) to be sent if the trigger is within 10 minutes of the last alert.

11.12.2. Once the 10 minutes has expired the wireless modem will not trigger a subsequent alarm for another 10 minutes.

11.12.3. This table is based on a 10 second delay before the alarm is triggered;

Time	00:00	00:10	05:00	10:00	15:00	20:00	20:10	20:20

Event	IO triggered		IO triggered	Alarm Restored	IO triggered	Alarms allowed	IO triggered	
Action		SMS	Ignored		Ignored			SMS

11.12.4. **Analogue Input Alarm**

11.12.4.1. The analogue alarm can be set to activate on a specific voltage;

- **Low Level**
- **High Level**
- **Both Levels**
  - **Low Level**
    - Set the value that the alarm should trigger at here (and enable the feature by choosing 'Low level') or disable the alarm by choosing 'off'
  - **High Level**
    - Set the value that the alarm should trigger at here (and enable the feature by choosing 'High level') or disable the alarm by choosing 'off'
  - **Both Levels**
    - Set the 'Low Level' and 'High Level' values that the alarm should trigger at here (and enable the feature by choosing 'Both Levels ') or disable the alarm by choosing 'off'

11.12.4.2. Send Alert Message on Restore to normal analogue level

- You can use this opton if you want to be notified when the analogue voltage returns to the 'normal' (non-alert) level.

11.12.4.3. Use self adjusted Alarm level with deviation from reference when Alarm is activated

- This option is presently not available.

11.12.5. **A/D Cal Param**

- The following procedure is required to produce a range of -10 dgC to 50dgC using a 4-20ma output Temperature Sensor (range from -10 dgC to 50dgC) on an IO adapter board for use with a wireless modem.

- We will use IO3 on the modem for this procedure but you can use any of the analogue inputs (3 – 7).

- Firmware requirements – you need at minimum … 20100707 CT0408.

  Check your modem firmware version, this document is only for the version CT0408 or higher (Checked by ETI command, in "SW#" line CT****) If it is not, please contact us.

- Equipment needed;

  - *Wireless Modem*
  - *IO Adapter board*
  - Multifunction calibrator with 4-20mA adjustable current source output.

- Procedure

  1. Configure ETM9900-1 IO3 as Analogue input, and check 'Scaled with calibrated values' in internet Data Transfer Tab by configuration tool.
  2. Connect Multifunction calibrator or current source on IO3 of IO adaptor board (mA- to Comm; mA+ to I/O3).
  3. Set Multifunction calibrator or current source to 4 mA output (First input point).
  4. Power up the IO board and the ETM99xx, quickly press “ESC” key several times in the Configuration Tool / Terminal Tab.
  5. The modem should respond with ‘escape pressed’.

6. Check that the IO3 analogue readings are correct by sending the command"ETRAI3" (refer to I/O Pins and A/D channel numbers mapping section). Readings should range from 0 to 2499mV.

7. Send command "ETSAC=3,-10,50,20,dgC (refer to ETSAC Commands section)" , the modem will respond with;

   ETSAC=3,-10,50,20,dgC

   OK

8. After a short period of time the modem should respond with;

   First Point Set, Set Next. Send SPACE when done!

9. Now set the Multifunction calibrator (Second input point) within 20sec (timeout period), then press "SPACE" key

   Note: You need to finish steps 7 through to 9 within 20 seconds (timeout period you set in command). If the operation times out then you can increase the timeout by increasing the value from 20 to 30 in the ETSAC command. If the operation has timed out you will see the following Error Message, no settings will saved to the modem in this situation:

   ERROR: Wait Timeout

10. If successful the modem will respond with;

    OK

11. Press the "READ MEMORY" button in the Configuration Tool to check that the setting has been successfully set in "A/D Cal Param" section in IO3 Tab

12. Connect the Temperature Sensor on IO3, power cycle the ETM modem and once the modem has restarted recheck the IO3 analogue readings by sending the command "ETRAI3".

13. The readings should now range from -10 dgC to 50 dgC according to 4-20mA.

- References

ETSAC Command

ETSAC= n,p1,p2,timeout,unit

n = A/D channel number, 1 – 7.
p1 = First Input point.
p2 = Second Input point.
timeout = Timeout (s) when entering the second point. If setting “0” in the timeout field, the default timeout (10sec) will be used.

unit = Unit (mV, V, m, cm, mm, dgC, dgF, mA, A, W, kW, percent …etc). If setting “0” in the unit field, the calculations will be set to default (mV) and the point settings will be discarded.

- I/O Pins and A/D channel numbers mapping:

  AI3 means A/D channel number ch3.

  There are 12 A/D channel numbers on the MCU.

  RJ45 Pin 1; I/O Pin 1, Digital I/O, Interrupt (S0 counting),
  RJ45 Pin 2; I/O Pin 2, Digital I/O, Analogue Input, AI2
  RJ45 Pin 3; I/O Pin 3, Digital I/O, Analogue Input, AI3 (ETRAI3)
  RJ45 Pin 4; I/O Pin 4, Digital I/O, Analogue Input, AI4 (ETRAI4)
  RJ45 Pin 5; I/O Pin 5, Digital I/O, Analogue Input, AI5 (ETRAI5)
  RJ45 Pin 6; I/O Pin 6, Digital I/O, Analogue Input, AI6 (ETRAI6)
  RJ45 Pin 7; I/O Pin 7, Digital I/O, Analogue Input, AI7 (ETRAI7)

11.12.6. **Alerting description**

- The following is an example of multiple alerts where the wireless modem is configured to use SMS and TCP (UDP sends do not cause information to be written to the serial port so they are not described here);

```
<System is starting>
13:42:55.95 - ETM9910 SYSTEM START
13:43:07.20 - MS:^SYSSTART
13:43:15.42 - SIM READY
13:43:18.40 - Registered, home network
13:43:21.40 - Net Provider:"**********",2
13:43:24.40 - Signal Quality:-101dBm(6)"Weak"
13:43:27.40 - Signal Quality:-101dBm(6)"Weak"
13:43:30.40 - Signal Quality:-101dBm(6)"Weak"
13:43:33.48 - SMS Message Service OK
13:43:34.07 - SIM:SMS Central no:+61414******
13:43:34.84 - SUPPL VOLT:8.94V
13:43:36.01 - Modem Init:at+cgdcont=1,"ip","**********"
13:43:36.48 - Init OK
13:43:36.48 - Connect:atd*99***1#
13:43:36.71 - ISP Connect
13:43:38.70 - PAP Login OK
13:43:38.70 - Waiting for IP-Context
13:43:50.67 - Local IP Address:***.***.***.***
13:43:55.65 - MSG:INTERNET CONNECT
< System has started >

< Digital 1 has gone low >
13:49:13.34 - ALARM: 1DL
13:49:15.60 - Sending SMS no:1 to phone no:0414******
```

13:49:19.90 - SMS Send OK, index:151
< Digital 1 Alert SMS has been sent >

< Opening ***.***.***.*** for port 2068 >
13:49:21.06 - Connecting RIP:***.***.***.***:2068
13:49:23.62 - LP:2200
13:49:23.62 - MSG:SOCKET OPEN[!]
13:49:27.82 - MSG:SOCKET CLOSED
< Closing ***.***.***.*** for port 2068 >

< Digital 1 has gone high >
13:50:57.25 - ALARM: 1DH
13:50:59.51 - Sending SMS no:2 to phone no:0414******
13:51:03.68 - SMS Send OK, index:152
< Digital 1 Alert SMS has been sent >

< Opening ***.***.***.*** for port 2068 >
13:51:04.46 - Connecting RIP:***.***.***.***:2068
13:51:04.46 - LP:2200
13:51:06.92 - MSG:SOCKET OPEN[!]
13:51:10.73 - MSG:SOCKET CLOSED
< Closing ***.***.***.*** for port 2068 >

< Analogue 5 has gone low >
13:54:39.03 - ALARM: 5AL
13:54:41.31 - Sending SMS no:3 to phone no:0414******
13:54:45.37 - SMS Send OK, index:153
< Analogue 5 Alert SMS has been sent >

< Opening ***.***.***.*** for port 2068 >
13:54:46.26 - Connecting RIP:***.***.***.***:2068
13:54:54.07 - LP:2200
13:54:54.07 - MSG:SOCKET OPEN[!]

< Analogue 7 has gone low >
13:54:54.09 - ALARM: 7AL
13:54:56.29 - Sending SMS no:4 to phone no:0414******
13:54:59.92 - SMS Send OK, index:154
< Analogue 7 Alert SMS has been sent >

< Analogue 3 has gone low >
13:55:00.75 - ALARM: 3AL
13:55:02.78 - Sending SMS no:5 to phone no:0414******
13:55:06.75 - SMS Send OK, index:155
< Analogue 3 Alert SMS has been sent >

< Analogue 4 has gone low >
13:55:07.73 - ALARM: 4AL
13:55:09.78 - Sending SMS no:6 to phone no:0414******
13:55:13.21 - SMS Send OK, index:156
< Analogue 4 Alert SMS has been sent >

13:55:14.82 - MSG:SOCKET CLOSED
< Closing ***.***.***.*** for port 2068 >

< Opening ***.***.***.*** for port 2068 >
13:55:14.84 - Connecting RIP:***.***.***.***:2068
13:55:15.37 - LP:2201
13:55:15.37 - MSG:SOCKET OPEN[!]
13:55:21.00 - MSG:SOCKET CLOSED
< Closing ***.***.***.*** for port 2068 >

< Analogue 3 has gone high >
13:56:55.92 - ALARM: 3AH
13:56:58.18 - Sending SMS no:7 to phone no:0414******
13:57:01.73 - SMS Send OK, index:157
< Analogue 3 Alert SMS has been sent >

< Opening ***.***.***.*** for port 2068 >
13:57:02.64 - Connecting RIP:***.***.***.***:2068
13:57:10.62 - LP:2200
13:57:10.64 - MSG:SOCKET OPEN[!]

< Analogue 4 has gone high >
13:57:10.64 - ALARM: 4AH
13:57:12.67 - Sending SMS no:8 to phone no:0414******
13:57:16.75 - SMS Send OK, index:158
< Analogue 4 Alert SMS has been sent >

< Analogue 5 has gone high >
13:57:17.62 - ALARM: 5AH
13:57:19.67 - Sending SMS no:9 to phone no:0414******
13:57:23.70 - SMS Send OK, index:159
< Analogue 5 Alert SMS has been sent >

< Analogue 7 has gone high >
13:57:24.62 - ALARM: 7AH
13:57:26.67 - Sending SMS no:10 to phone no:0414******
13:57:30.68 - SMS Send OK, index:160
< Analogue 7 Alert SMS has been sent >

13:57:32.21 - MSG:SOCKET CLOSED
< Closing ***.***.***.*** for port 2068 >

< Opening ***.***.***.*** for port 2068 >
13:57:32.21 - Connecting RIP:***.***.***.***:2068
13:57:32.75 - LP:2201
13:57:32.75 - MSG:SOCKET OPEN[!]

< Analogue 3 has gone high >
13:57:32.76 - ALARM: 3AH
13:57:34.65 - Sending SMS no:11 to phone no:0414******
13:57:38.68 - SMS Send OK, index:161
< Analogue 3 Alert SMS has been sent >

< Analogue 4 has gone high >
13:57:39.60 - ALARM: 4AH
13:57:41.64 - Sending SMS no:12 to phone no:0414******
13:57:45.68 - SMS Send OK, index:162
< Analogue 4 Alert SMS has been sent >

13:57:47.18 - MSG:SOCKET CLOSED
< Closing ***.***.***.*** for port 2068 >

< Opening ***.***.***.*** for port 2068 >
13:57:47.20 - Connecting RIP:***.***.***.***:2068
13:57:47.75 - LP:2201
13:57:47.75 - MSG:SOCKET OPEN[!]

< Analogue 3 has gone high >
13:57:47.76 - ALARM: 3AH
13:57:49.64 - Sending SMS no:13 to phone no:0414******
13:57:53.68 - SMS Send OK, index:163
< Analogue 3 Alert SMS has been sent >

< Analogue 4 has gone high >
13:57:56.35 - ALARM: 4AH
13:57:58.62 - Sending SMS no:14 to phone no:0414******
13:58:02.67 - SMS Send OK, index:164
< Analogue 4 Alert SMS has been sent >

13:58:07.81 - MSG:SOCKET CLOSED
< Closing ***.***.***.*** for port 2068 >

< Analogue 3 has gone low >
13:59:30.78 - ALARM: 3AL
13:59:33.04 - Sending SMS no:15 to phone no:0414******
13:59:37.10 - SMS Send OK, index:165
< Analogue 3 Alert SMS has been sent >

< Opening ***.***.***.*** for port 2068 >
13:59:38.00 - Connecting RIP:***.***.***.***:2068
13:59:46.01 - LP:2200
13:59:46.03 - MSG:SOCKET OPEN[!]

< Analogue 4 has gone low >

13:59:46.04 - ALARM: 4AL
13:59:48.03 - Sending SMS no:16 to phone no:0414******
13:59:51.95 - SMS Send OK, index:166
< Analogue 4 Alert SMS has been sent >

< Analogue 5 has gone low >
13:59:52.96 - ALARM: 5AL
13:59:55.01 - Sending SMS no:17 to phone no:0414******
13:59:58.96 - SMS Send OK, index:167
< Analogue 5 Alert SMS has been sent >

< Analogue 7 has gone low >
13:59:59.96 - ALARM: 7AL
14:00:02.01 - Sending SMS no:18 to phone no:0414******
14:00:05.43 - SMS Send OK, index:168
< Analogue 7 Alert SMS has been sent >

14:00:07.06 - MSG:SOCKET CLOSED
< Closing ***.***.***.*** for port 2068 >

< Opening ***.***.***.*** for port 2068 >
14:00:07.56 - Connecting RIP:***.***.***.***:2068
14:00:07.57 - LP:2201
14:00:13.21 - MSG:SOCKET OPEN[!]
14:00:13.23 - MSG:SOCKET CLOSED
< Closing ***.***.***.*** for port 2068 >

< Analogue 3 has gone high >
14:00:58.20 - ALARM: 3AH
14:01:00.46 - Sending SMS no:19 to phone no:0414******
14:01:04.48 - SMS Send OK, index:169
< Analogue 3 Alert SMS has been sent >

< Opening ***.***.***.*** for port 2068 >
14:01:05.42 - Connecting RIP:***.***.***.***:2068
14:01:05.90 - LP:2200
14:01:05.92 - MSG:SOCKET OPEN[!]

< Analogue 4 has gone high >
14:01:05.93 - ALARM: 4AH
14:01:07.96 - Sending SMS no:20 to phone no:0414******
14:01:11.98 - SMS Send OK, index:170
< Analogue 4 Alert SMS has been sent >

< Analogue 5 has gone high >
14:01:12.92 - ALARM: 5AH
14:01:14.95 - Sending SMS no:21 to phone no:0414******
14:01:18.98 - SMS Send OK, index:171
< Analogue 5 Alert SMS has been sent >

< Analogue 7 has gone high >
14:01:19.90 - ALARM: 7AH
14:01:21.95 - Sending SMS no:22 to phone no:0414******
14:01:25.95 - SMS Send OK, index:172
< Analogue 7 Alert SMS has been sent >

14:01:27.48 - MSG:SOCKET CLOSED
< Closing ***.***.***.*** for port 2068 >

< Opening ***.***.***.*** for port 2068 >
14:01:28.00 - Connecting RIP:***.***.***.***:2068
14:01:28.01 - LP:2201
14:01:33.65 - MSG:SOCKET OPEN[!]
14:01:33.67 - MSG:SOCKET CLOSED
< Closing ***.***.***.*** for port 2068 >

< Digital 1 has gone low >
14:02:29.12 - ALARM: 1DL
14:02:31.39 - Sending SMS no:23 to phone no:0414******
14:02:35.48 - SMS Send OK, index:173
< Digital 1 Alert SMS has been sent >

< Opening ***.***.***.*** for port 2068 >

```
14:02:36.34 - Connecting RIP:***.***.***.***:2068
14:02:38.68 - LP:2200
14:02:38.68 - MSG:SOCKET OPEN[!]

< Digital 2 has gone high >
14:02:38.70 - ALARM: 2DH
14:02:40.87 - Sending SMS no:24 to phone no:0414******
14:02:44.90 - SMS Send OK, index:174
< Digital 2 Alert SMS has been sent >

14:02:50.59 - MSG:SOCKET CLOSED
< Closing ***.***.***.*** for port 2068 >
```

- You will see from the information above that the wireless modem successfully handles multiple concurrent alerts (alerts sent asynchronously);

- The wireless modem detects I/O alerts and delivers them in order

- The wireless modem keeps the currently open socket available for any new alerts and closes the socket when it is no longer needed

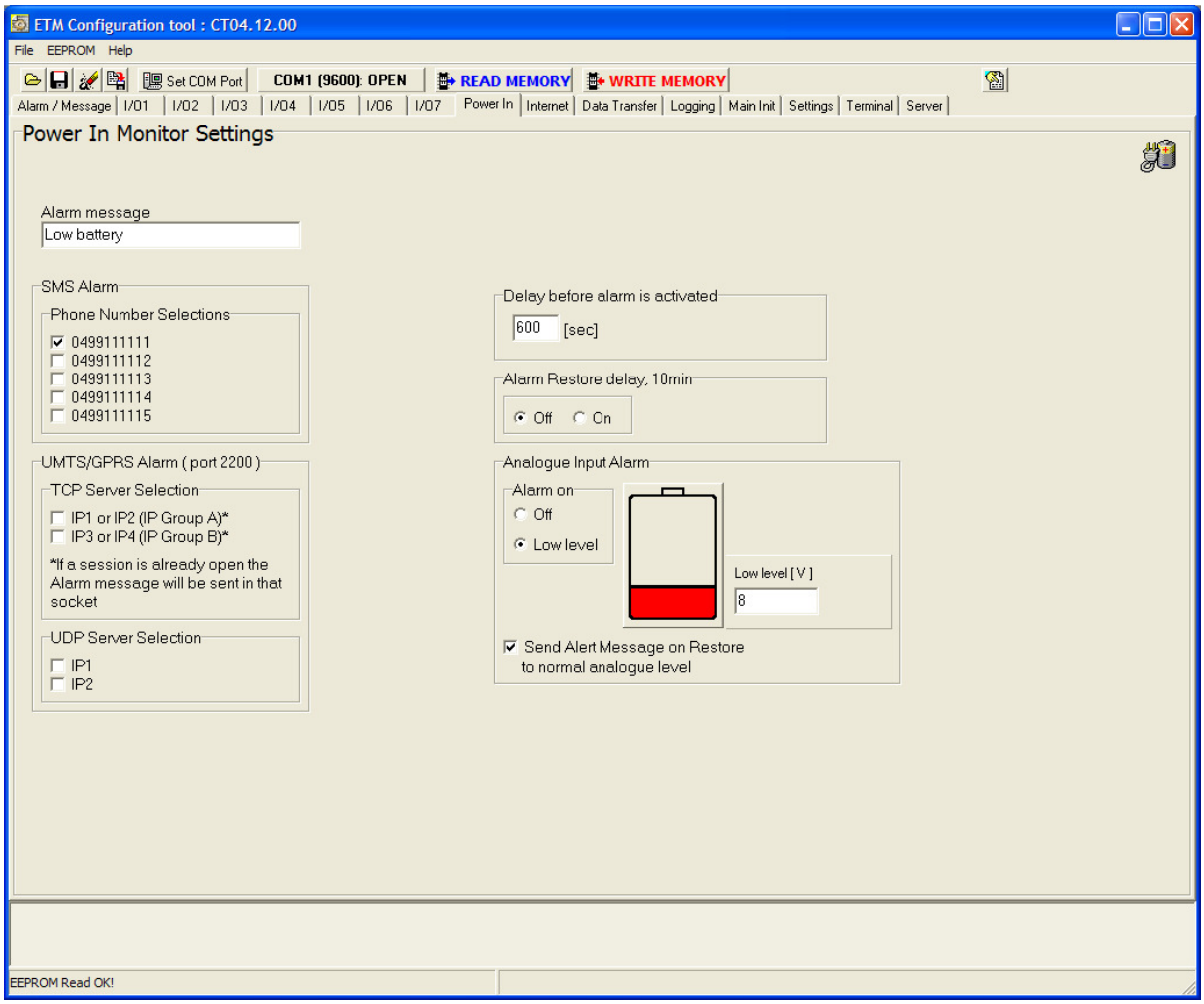
- In situations where an input changes state faster than the alert can go out, such as when an input might go High / Low / High, it is possible that the modem will fail to send an alert if it is currently busy with an existing alert for the input – the modem does not internally queue alerts.

- If the modem is in LPM (sleep) mode and an input changes state the modem will wait at least 60 seconds before it wakes up and then at least another 60 seconds before it will actually send the alert.

  BUT if the input returns to the original (non-alert) state before the second 60 seconds has elapsed then it is possible that the alert will not be sent. This is a result of the change from LPM to normal operation and cannot be made to operate in a different way.

12. Power In Monitoring

12.10. When operating the unit on a battery, an alarm will warn when the supply voltage level has fallen below a specific level.



12.11. SMS Alarm and UMTS/GPRS (GPRS only if 9570) Alarm

12.6.11 These items are configured in the same way as SMS Alarm section and GPRS Alarm section

12.12. Delay before alarm is activated

12.6.12 This item is configured in the same way as Delay section.

12.7.12 Do not set the delay value too low, more than 60 seconds is recommended, otherwise you risk being inundated with SMS notifications if the battery level hovers/cycles around the trigger point – we recommend that you set the value to 600 seconds (10 minutes) in normal operation.

12.13. Alarm Restore Delay

12.6.13 This item is configured in the same way as Delay section.

It is our recommendation that you always use the alarm delay for the battery alarm to avoid multiple alarms when the supply voltage fluctuates around the alarm trigger.

Do not set the delay value too low, more than 60 seconds is recommended, otherwise you risk being inundated with SMS notifications if the battery level hovers/cycles around the trigger point – we recommend that you set the value to 600 seconds (10 minutes) in normal operation.

12.7.13 **Analogue Input Alarm**

The battery alarm can be set to activate on a specific voltage.

1. Lower Level
    - Set the value that the alarm should trigger at here (and enable the feature by choosing ‘lower level’) or disable the alarm by choosing ‘off’.

12.8.13 **Send Alert Message on Restore to normal analogue level**

1. You can use this opton if you want to be notified when the battery voltage returns to the ‘normal’ level.

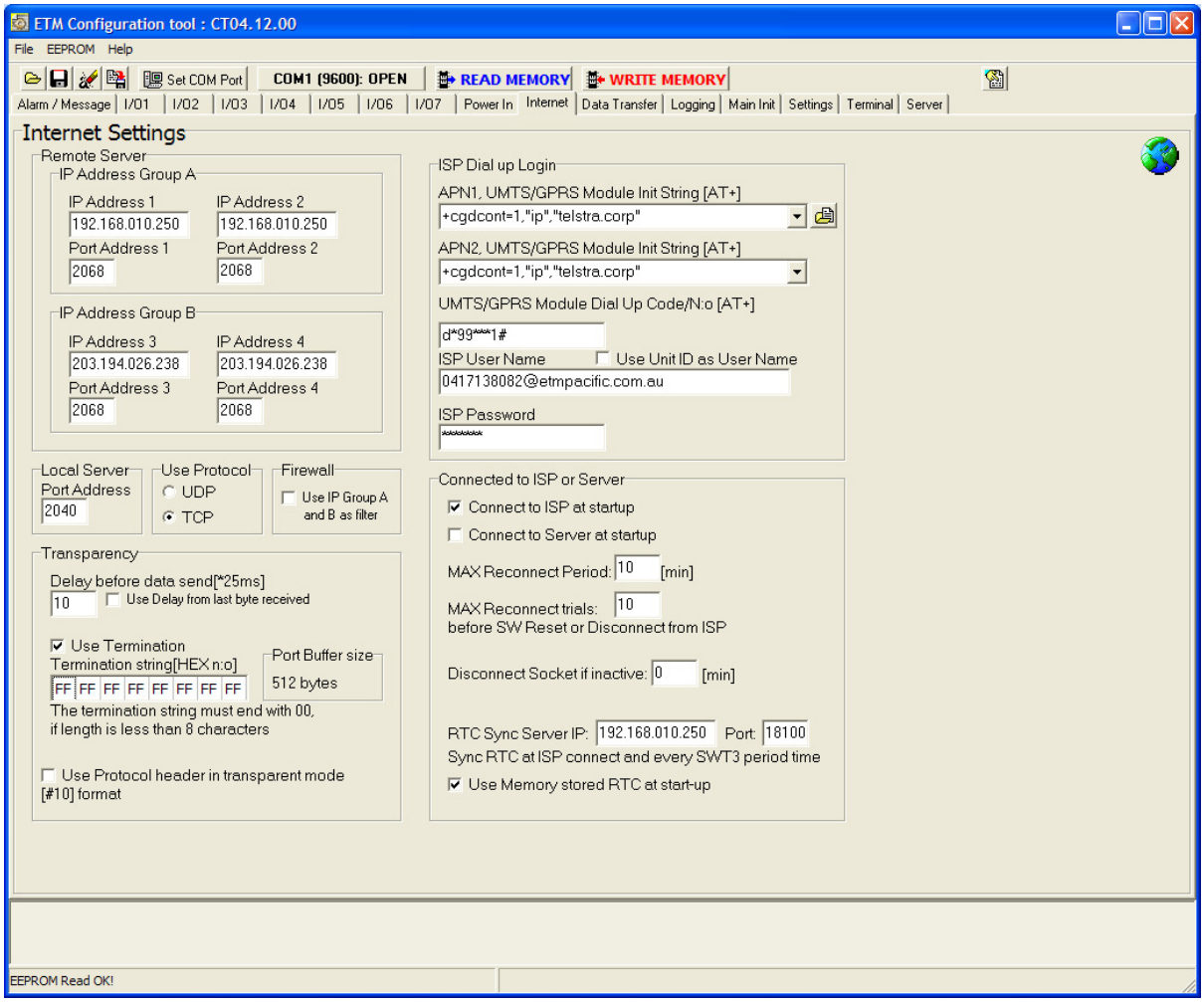
12.9.13 ***Notes:***

The battery alarm is presented as a #9 data format for SMS or data sends

If you are not using this feature, because you are powering the wireless modem from a constant supply, you can use this feature as a pseudo ‘Device Restarted’ feature by setting the ‘lower level’ to a value double the supply voltage and each time the wireless modem restarts due to a power failure you will receive an alert….. make sure you set an appropriate alert message and configure your own number as a destination.

13. Internet

13.10. This section has settings which controls how the unit communicates over the internet with a server.



13.11. Remote server

12.6.10 IP Address 1 and 2 are a pair of addresses that can be used on the Internet Transfer page. The wireless modem will switch between the two addresses in the group if one address cannot be contacted.

12.7.10 IP Address 3 and 4 are a pair of addresses that can be used on the Internet Transfer page. The wireless modem will switch between the two addresses in the group if one address cannot be contacted.

12.8.10 The port address is the port number on the remote server. Refer to '*ETM 9500 TCP UDP Port configuration specifications*' for further details on available ports.

12.9.10 Remember; You will need to forward the chosen port(s) to a server behind your firewall.

13.12. Local Server

12.10.10 This sets the port number from which the unit sends its messages.

12.11.10 Port 2040 should always be used – if you want to change this please contact ETM Pacific Support to discuss the ramifications of changing this port

13.13. Use Protocol

12.12.10 This lets you select UDP or TCP protocol as the default protocol when using the serial port to send data

12.13.10 **Note:** Please refer to 'AN0081 - Control the Network/Stack in an ETM Modem' when selecting UDP here

13.14. Firewall

12.14.10 If you turn on the firewall only packets coming from the IP-addresses specified in Group A and Group B will be responded to.

13.15. Transparency

12.15.10 **Delay before data send [*25ms]**

- Enable this option is you don't always have a specific termination character or characters, such as a carriage return, to trigger the send.

- 'Delay before data send' should be unchecked if you are using Termination Character.

12.16.10 **Port Buffer Size**

- This is limited in total to 512 bytes

- You can send up to 512 bytes in one packet – there is no buffer beyond the single 512 bytes available

12.17.10 Termination Character

- If you are sure that there is always a defined character on the end of a line to be sent enter the HEX representation of the ASCII value for that character and select 'Use Termination'.

- You should always start entering the termination character (string) from the left hand side of the entry area and any entries that are not used should have FF entered.

- If your termination is less than 8 characters then enter 00 directly after the entered termination. As an example if you are searching for HEX 0A (the Linefeed character) then you would enter;

  0A 00 FF FF FF FF FF FF

- 'Use Termination' should be unchecked if you are using 'Delay before data send'.

- A good place to look for the correct HEX representation of ASCII values is http://www.asciitable.com/

Dec	Hx	Oct	Char	Dec	Hx	Oct	Html	Chr	Dec	Hx	Oct	Html	Chr	Dec	Hx	Oct	Html	Chr
0	0	000	NUL (null)	32	20	040		Space	64	40	100	@	@	96	60	140	`	`
1	1	001	SOH (start of heading)	33	21	041	!	!	65	41	101	A	A	97	61	141	a	a
2	2	002	STX (start of text)	34	22	042	"	"	66	42	102	B	B	98	62	142	b	b
3	3	003	ETX (end of text)	35	23	043	#	#	67	43	103	C	C	99	63	143	c	c
4	4	004	EOT (end of transmission)	36	24	044	$	$	68	44	104	D	D	100	64	144	d	d
5	5	005	ENQ (enquiry)	37	25	045	%	%	69	45	105	E	E	101	65	145	e	e
6	6	006	ACK (acknowledge)	38	26	046	&	&	70	46	106	F	F	102	66	146	f	f
7	7	007	BEL (bell)	39	27	047	'	'	71	47	107	G	G	103	67	147	g	g
8	8	010	BS (backspace)	40	28	050	(	(	72	48	110	H	H	104	68	150	h	h
9	9	011	TAB (horizontal tab)	41	29	051	)	)	73	49	111	I	I	105	69	151	i	i
10	A	012	LF (NL line feed, new line)	42	2A	052	*	*	74	4A	112	J	J	106	6A	152	j	j
11	B	013	VT (vertical tab)	43	2B	053	+	+	75	4B	113	K	K	107	6B	153	k	k
12	C	014	FF (NP form feed, new page)	44	2C	054	,	,	76	4C	114	L	L	108	6C	154	l	l
13	D	015	CR (carriage return)	45	2D	055	-	-	77	4D	115	M	M	109	6D	155	m	m
14	E	016	SO (shift out)	46	2E	056	.	.	78	4E	116	N	N	110	6E	156	n	n
15	F	017	SI (shift in)	47	2F	057	/	/	79	4F	117	O	O	111	6F	157	o	o
16	10	020	DLE (data link escape)	48	30	060	0	0	80	50	120	P	P	112	70	160	p	p
17	11	021	DC1 (device control 1)	49	31	061	1	1	81	51	121	Q	Q	113	71	161	q	q
18	12	022	DC2 (device control 2)	50	32	062	2	2	82	52	122	R	R	114	72	162	r	r
19	13	023	DC3 (device control 3)	51	33	063	3	3	83	53	123	S	S	115	73	163	s	s
20	14	024	DC4 (device control 4)	52	34	064	4	4	84	54	124	T	T	116	74	164	t	t
21	15	025	NAK (negative acknowledge)	53	35	065	5	5	85	55	125	U	U	117	75	165	u	u
22	16	026	SYN (synchronous idle)	54	36	066	6	6	86	56	126	V	V	118	76	166	v	v
23	17	027	ETB (end of trans. block)	55	37	067	7	7	87	57	127	W	W	119	77	167	w	w
24	18	030	CAN (cancel)	56	38	070	8	8	88	58	130	X	X	120	78	170	x	x
25	19	031	EM (end of medium)	57	39	071	9	9	89	59	131	Y	Y	121	79	171	y	y
26	1A	032	SUB (substitute)	58	3A	072	:	:	90	5A	132	Z	Z	122	7A	172	z	z
27	1B	033	ESC (escape)	59	3B	073	;	;	91	5B	133	[	[	123	7B	173	{	{
28	1C	034	FS (file separator)	60	3C	074	<	<	92	5C	134	\	\	124	7C	174			|
29	1D	035	GS (group separator)	61	3D	075	=	=	93	5D	135	]	]	125	7D	175	}	}
30	1E	036	RS (record separator)	62	3E	076	>	>	94	5E	136	^	^	126	7E	176	~	~
31	1F	037	US (unit separator)	63	3F	077	?	?	95	5F	137	_	_	127	7F	177	&#127;	DEL

Source: www.LookupTables.com

13.16. ISP Dial up Login

12.18.10 APN sets the Access Point Name to use with the GPRS connection.

In this string;

+cgdcont=1,"ip","internet"

… you would only change “internet” to “internet.netcom.no” or select the right APN from the drop down menu.

You can overwrite any of the available APNs if your APN does not exist.
If you want to create your own list of APNs you need only create a text file with the appropriate APNs and then select the ‘file open’ button to the right of the topmost APN dropdown list to load your chosen list.

12.19.10 ‘Dial up Code’ should be;

d*99***1#

…. that is;

d star 99 star star star 1 hash (or pound)

13.17. Connected to ISP or Server

12.20.10 **Connect to ISP at start-up**

- When the unit powers up it can automatically connect to the ISP, this is the normal mode of operation when using internet services – **DO NOT** check this is you are not using internet based services.

12.21.10 **Connect to Server at start-up**

- When the unit powers and automatically connects to the ISP the unit will establish a socket to IP1 or IP2 (**NOT** to IP3 or IP4).

- Use of this feature, ‘Connect to Server at startup’, will cause some aspects of the capabilities on the ‘Internet Data Transfer’ tab to be unavailable. Use of this feature would result in a permanent connection being maintained to the nominated server.

12.22.10 **Max Reconnect Period**

- This is the maximum time a reconnect will be attempted before it is considered a failure

- We recommend a value of 10 in this entry

12.23.10 Max Reconnect Trials

- This is the maximum amount of times a reconnect will be attempted before the wireless modem is restarted in an effort to connect to the carrier.

- We recommend a value of 5 in this entry

- If the reconnect trials have been reached, and the module is attempting to connect to a server, the wireless modem will disconnect from the ISP and try to establish a new ISP connection and a connection to the server. If the wireless modem is trying to connect to an ISP and the reconnect trials counts have been reached, the wireless modem will do a software reset and reboot the system and then continue to try and establish a new ISP connection.

Note in relation to Reconnect Period and Trials

- If the LPM timer expires before the reconnect period/trials then the wireless modem will not reset but will instead go into sleep mode (LPM). When the wireless modem comes out of sleep mode (LPM) the previous failures will be ignored and the counters will start again.

- This allows the wireless modem to continue to perform as a data logger in a situation where there is no signal.

12.24.10 Disconnect Socket if inactive

- You can use this to disconnect from your Server if you don't send data for a specified period.

- After you disconnect from the Server you can still send an SMS to cause the socket to be reconnected.

- As well you can send TCP/UDP packages to the unit (if on a VPN or the SIM has a fixed external IP address) to cause it to reconnect if required, as long as the unit is still powered and connected to an ISP.

- This feature is not useful if the sleep mode functionality is being used.

- We recommend that you make use of this feature where possible (when using TCP), leaving the value set to 0 can sometimes cause the wireless modem to ignore a disconnected socket.

12.25.10 RTC Sync Server IP

- You can enter the IP address of a known NTP server (either on the internet or vpn) and the wireless modem will connect at ISP connect and every 24 hours afterwards (if the wireless modem stays connected) to set the RTC.

- You still need to set the Reference Date to the values you want so that you have a valid date for your logged data.

- Setting the IP Address to 255.255.255.255 will disable the feature.

13.18. Use Memory stored RTC at startup

- If you check this option then when the wireless modem starts up it retrieves the last known time from the EEPROM.

- When you use this featue you still need to set the RTC in the wireless modem to update the time in the wireless modem as the Reference Date and RTC will be based on the last information written to the EEPROM.

Simplified instructions:

Internet Tab / RTC Sync Server IP (Port) set to 255.255.255.255 AND 'Use Memory stored RTC at start-up' is UNCHECKED - when configured like this the wireless modem will take the network time and use it as the basis for the RTC update which happens whenever the wireless modem is powered up or wakes up from LPM. This is not a reliable configuration and we recommend not using this configuration.

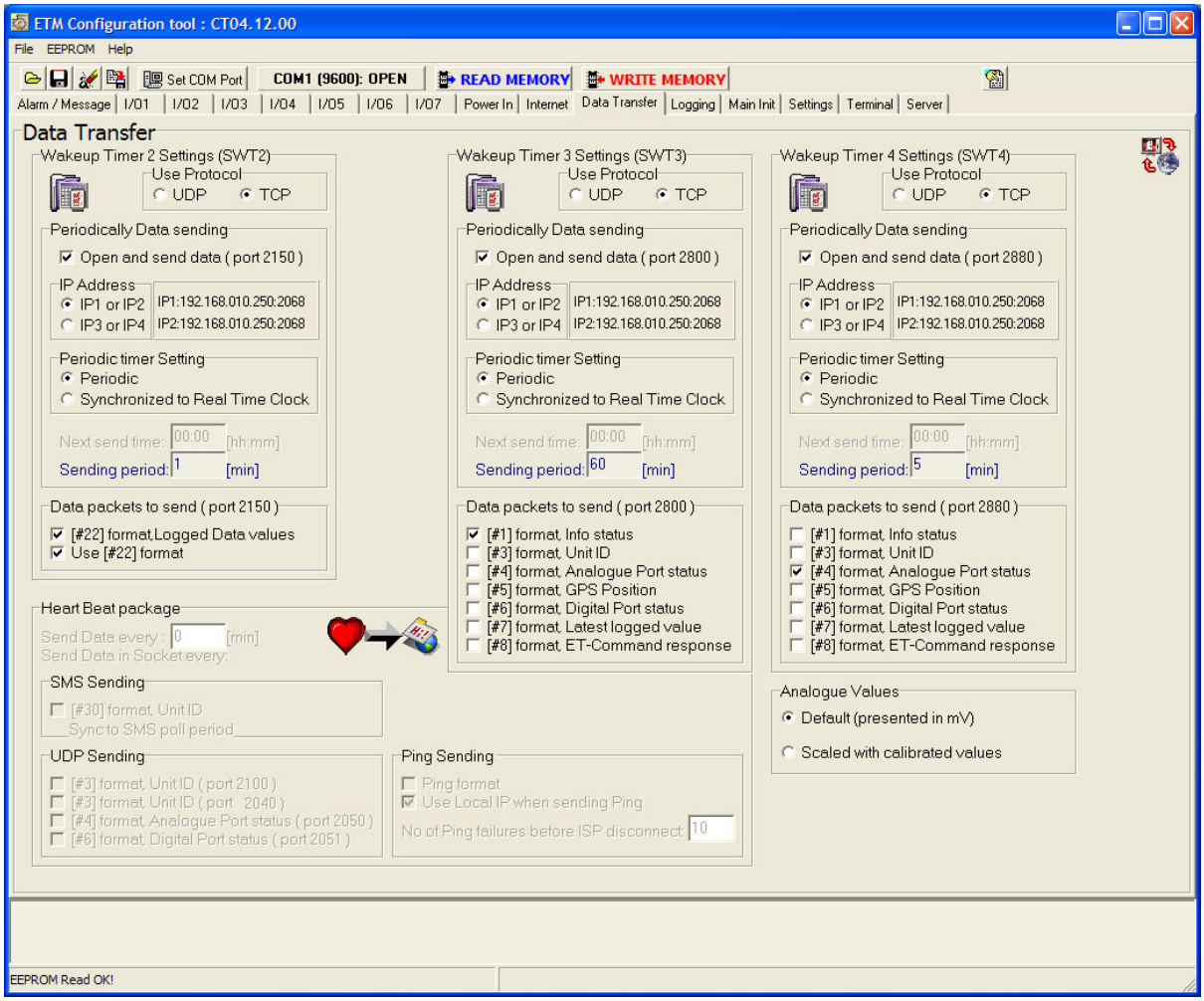
Internet Tab / RTC Sync Server IP (Port) set to www.xxx.yyy.zzz (pp) AND 'Use Memory stored RTC at start-up' is UNCHECKED - when configured like this the wireless modem will connect to the nominated IP address and port and will use the retrieved time as the basis for the RTC update which happens whenever the wireless modem is powered up or wakes up from LPM. The wireless modem will also attempt to set the RTC once every 24 hours if online and connected.

Internet Tab / RTC Sync Server IP (Port) set to 255.255.255.255 AND 'Use Memory stored RTC at start-up' is CHECKED - when configured like this the wireless modem will use the retrieved time from the internal EEPROM as the basis for the RTC update which happens whenever the wireless modem is powered up or wakes up from LPM. The wireless modem will then, if configured, connect to the carrier and execute the options enabled in SWT2 - we suggest that #8 be then used to set the date and time

correctly for the RTC and that you have the required code implemented in your server application.

14. Internet Data Transfer

14.10. This section has settings which control how the unit sends data over the internet to a server.


ETM Configuration tool : CT04.12.00
File EEPROM Help
Set COM Port
COM1 (9600): OPEN
READ MEMORY
WRITE MEMORY
Alarm / Message | I/01 | I/02 | I/03 | I/04 | I/05 | I/06 | I/07 | Power In | Internet | Data Transfer | Logging | Main Init | Settings | Terminal | Server
Data Transfer
Wakeup Timer 2 Settings (SWT2)
Use Protocol
UDP TCP
Periodically Data sending
Open and send data (port 2150)
IP Address
IP1 or IP2
IP3 or IP4
IP1:192.168.010.250:2068
IP2:192.168.010.250:2068
Periodic timer Setting
Periodic
Synchronized to Real Time Clock
Next send time: 00:00 [hh:mm]
Sending period: 1 [min]
Data packets to send (port 2150)
[#22] format,Logged Data values
Use [#22] format
Wakeup Timer 3 Settings (SWT3)
Use Protocol
UDP TCP
Periodically Data sending
Open and send data (port 2800)
IP Address
IP1 or IP2
IP3 or IP4
IP1:192.168.010.250:2068
IP2:192.168.010.250:2068
Periodic timer Setting
Periodic
Synchronized to Real Time Clock
Next send time: 00:00 [hh:mm]
Sending period: 60 [min]
Data packets to send (port 2800)
[#1] format, Info status
[#3] format, Unit ID
[#4] format, Analogue Port status
[#5] format, GPS Position
[#6] format, Digital Port status
[#7] format, Latest logged value
[#8] format, ET-Command response
Wakeup Timer 4 Settings (SWT4)
Use Protocol
UDP TCP
Periodically Data sending
Open and send data (port 2880)
IP Address
IP1 or IP2
IP3 or IP4
IP1:192.168.010.250:2068
IP2:192.168.010.250:2068
Periodic timer Setting
Periodic
Synchronized to Real Time Clock
Next send time: 00:00 [hh:mm]
Sending period: 5 [min]
Data packets to send (port 2880)
[#1] format, Info status
[#3] format, Unit ID
[#4] format, Analogue Port status
[#5] format, GPS Position
[#6] format, Digital Port status
[#7] format, Latest logged value
[#8] format, ET-Command response
Heart Beat package
Send Data every : 0 [min]
Send Data in Socket every:
SMS Sending
[#30] format, Unit ID
Sync to SMS poll period
UDP Sending
[#3] format, Unit ID (port 2100)
[#3] format, Unit ID (port 2040)
[#4] format, Analogue Port status (port 2050)
[#6] format, Digital Port status (port 2051)
Ping Sending
Ping format
Use Local IP when sending Ping
No of Ping failures before ISP disconnect: 10
Analogue Values
Default (presented in mV)
Scaled with calibrated values
EEPROM Read OK!

*** In the above image the Heart Beat package, SMS Sending, UDP Sending and Ping Sending are disabled because the Configuration Tool has automatically detected that the modem is configured to use the Australian Telstra network APN (based on the requirements of Telstra approval for the modem). If the modem is on any other network these features will be available.

14.11. Logical Layout Description

12.26.10 The Internet Data Transfer tab is, mostly, laid out in a vertical fashion and specifically relates to the various timers, SWT<x>, that control the sending of data.

The three timers that relate to the sending of data are;

- SWT2 – This timer sends the archived/logged data -see the logging tab tab for which specific inputs are being sent. The sending port will be 2150.

- SWT3 – This timer sends the current values as configured. The sending port will be 2800.

- SWT4 – This timer sends the current values as configured. The sending port will be 2880.

14.12. Setting the SWT Timers

- Setting the SWT timers is done by clicking on the Terminal tab and then clicking on the terminal window, so that a flashing cursor is displayed.

- To set an SWT timer you send the following command;

  ETSWT=1,00:00,1

  ….. and you modify it based on what you want the timer to do.

Requirement	Command	TimerID	Periodic	Delimiter	Interval
Every minute	ETSWT=	1	00:00	,	1
Every ten minutes	ETSWT=	1	00:00	,	10
Start at midday and then every 30 minutes after that * **(Synchronized to Real Time Clock)**	ETSWT=	1	12:00	,	30

* If you use the **Synchronized to Real Time Clock** functionality you need to enable it first in the wireless modem using the configuration tool, write the configuration to the wireless modem and power cycle the wireless modem. Then you should return to configuring the unit.

- One thing to note about using **Synchronized to Real Time Clock** is that if the software clock in the wireless modem has a time that is past the time entered then the wireless modem will not trigger the timer until the following day.

- You cannot modify the SWT timer minute values in the various tabs of the configuration tool – this task must be completed in the teminal window.

14.13. Functional Timing Description

- The presented configuration delivers the following solution (the intervals may not be representative of a valid setup but they are acceptable for this description):

- SWT2 - Causes the archived/logged data in any selected inputs to be sent every 1 minute, see the logging tab for which specific inputs are being sent. With the logging of the inputs taking place every minute a total of 7 data sets will be sent each time the timer expires. The data will be delivered to the IP address and port nominated in the IP1/IP2 group.

- SWT3 - Causes the current wireless modem information, signal levels / supply voltages, to be sent every 60 minutes. The data will be delivered to the IP address and port nominated in the IP3/IP4 group.

- SWT4 - Causes the the current analogue input information to be sent every 5 minutes. The data will be delivered to the IP address and port nominated in the IP1/IP2 group.

- One **VERY** important factor to consider when you you use LPM is that the wireless modem will only be awake for the period of time you configure it so you need to modify the SWT2, SWT3 and SWT4 timers so that they deliver data within the time that the wireless modem is awake – therefore if you have an awake time of **TEN** minutes you would set SWT2, SWT3 and SWT4 to a value that guarentees that the connections are made at least twice during the awake time.

  This means that an awake time of ten minutes should have four minutes as the SWT3, SWT4 and SWT4 time.

  The minimum value you should use for the SWT3, SWT4 and SWT4 timers is **TWO** minutes in **LPM** configuration.

14.14. Use Protocol

- Choose either TCP or UDP as the sending protocol for this SWT timer.

14.15. Open and send data (port xxxx)

- Only SWT timers, 2 / 3 / 4, with this option checked will send data.

- To disable sending for an SW timer simply uncheck the relevant SWT timer.

14.16. Periodic timer Setting

You have two choices here, 'Periodic' or 'Synchroised to Real Time Clock' and both are very different;

12.27.10 Periodic sending works on the configured interval so that if a value of 60 is entered a send will occur every 60 minutes.

There is, however, no control of what actual time the sending starts so if you need a sending to occur at a certain time you need to use 'Synchronised to Real Time Clock'.

12.28.10 Synchronised to Real Time Clock starts a send at the nominated time and then ADDS the 'Sending Period' to that time so that the next send is performed at the time required.

There is one significant issue with this type of sending – if the wireless modem is powered off and then powered on again at a later time the 'Real Time Clock', which is a software and not hardware clock, will now be out of sync with the real time and so your chosen starting times will no longer be accurate.

12.29.10 The wireless modem can have it's 'Real Time Clock' and 'Reference Date' reset by either connecting to serial port and sending the correct ET commands (the wireless modem does not need to be put into command mode but it must also not be asleep) OR the next time that the wireless modem connects by UDP or TCP the server can issue commands to resynchronise the wireless modem 'Real Time Clock' and 'Reference Date'.

14.17. Using #22 instead of #21 data

12.30.10 There is an option of ''Use [#22] Format' and when you check this the #21 data format is subtly changed to reflect the new #22 data send.

Refer to '*ETM Modems TCP UDP Protocol spec*' for further details on available ports.

14.18. UDP Heart beat package

- ***Note**: This feature has the potential to cause you issues if your carrier does not support short interval sending with minimal data content. Check your carriers terms of usage before you start to use these features.*

- ***Note:*** *Where there is 'telstra' in any part of the APN this feature is disabled, even though you can configure it in the configuration tool,*

12.31.10 Send Data every x minutes

- Set the value of minutes for the interval between sends – the minimum recommended interval is 60 minutes

12.32.10 SMS Sending

- Checking this option causes an SMS to be sent to the first SMS number defined on the Alarm / Message tab at the interval set in 'Send Data every x minutes'

- **Note:** If you have the word 'Telstra' in any part of the APN this feature is disabled (as it is meant to be used in an SMS only environment and in that case you would not have an APN configured)

12.33.10 #3 Unit ID (Port 2100)

- This sends the Unit ID from port 2100

12.34.10 #3 Unit ID (Port xxxx)

- This sends the Unit ID from port xxxxx

- The port used is the same as the local port entered in the 'Internet' Tab.

12.35.10 #4 Analogue Port status (Port 2050)

- This sends the current Analogue Port statuses from port 2050

#4,2,,4,000444,AI1.14,1462.75,mV,AI2.15,1498.16,mV,AI3.3,2499.38,mV,AI4.4,2499.38,mV,AI5.5,2499.38,mV,AI6.6,2499.38,mV,
AI7.7,2499.38,mV,SUPPL VOLT,13.50,V,VeR+,1369,mV,VeR-
,0,mV,MCUT,1081,mV,Vcc/2,1514,mV,

12.36.10 #6 Digital Port status (Port 2051)

- This sends the current Digital Port statuses <display a string as sent> from port 2051

  #6,2,,4,000446,1:DI,1,2:DI,1,3:DI,1,4:DI,1,5:DI,1,6:DI,1,7:DI,1,8:DI,1,9:DI,1,

- The advantages of sending this data by UDP is that transmission costs are reduced, using the UDP connectionless protocol) compared to TCP.

- The disadvantages of sending this data by using UDP is that because UDP is a connectionless protocol there is no guarantee that the data will be delivered. The wireless modem does not implement any form of delivery success detection on top of UDP.

14.19. **Send Period Time** / **Ping**

Note: Where there is 'telstra' in any part of the APN this feature is disabled, even though you can configure it in the configuration tool,

12.37.10 Send Data in Socket every x minutes allows you to send a packet of data that essentially keeps the connection open, because the carrier sees the data send as activity and therefore does not close the connection.

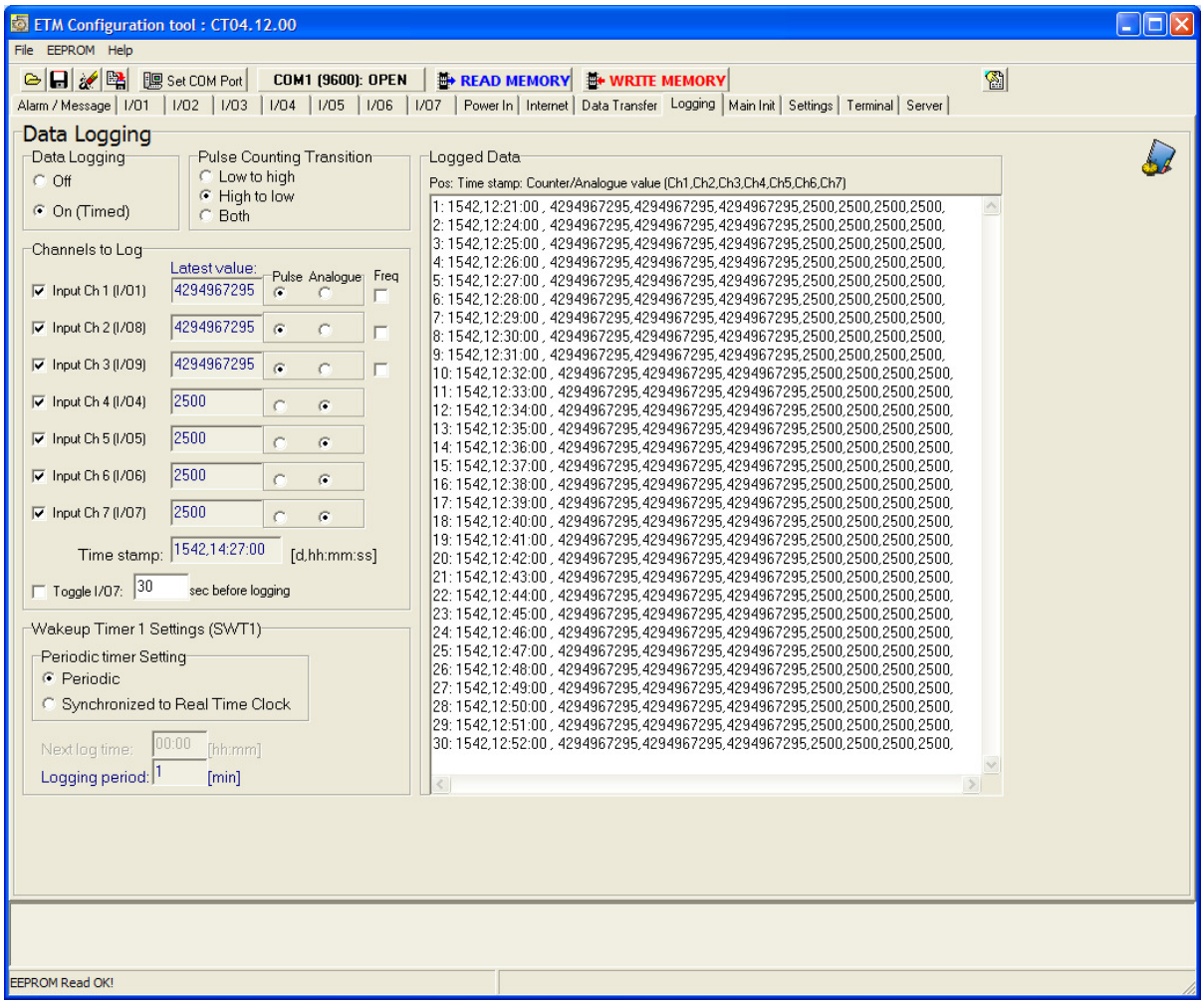
12.38.10 Ping Every needs to be checked for this feature to function.

12.39.10 No of Ping failures before ISP disconnect means that if an initial data send can be initiated then a 'ping failure' is registered and after a configured amount of failures the ISP is considered to be disconnected and the wireless modem will attempt to reconnect to the carrier.

12.40.10 Use Local IP-Add when sending Ping is used to make the wireless modem ping itself iin a effort to maintain the ISP connection.

15. Logging

15.10. A limited amount of data can be stored in memory during periods of network outages or if sleep mode is used



15.11. Data Logging

- You can enable or disable the logging of data with this selection

15.12. Pulse Counting Transition

12.41.10 You can count a pulse on the following state changes;

- High to Low

- Low to High
- Both (High to Low AND Low to High)

The digital input is driven high (+2.5v), with a high impedance resistor, and this is considered to be a High and when the input is connected to 0v (pin 8 on the RJ) the input is considered to be a Low

15.13. Periodic timer Setting

- See 'Periodic timer Setting' [Locate] for details of how to configure this option
- The logging interval is set using the SWT1 timer.

15.14. Logging slots available

The amount of logging slots available is determined by how many inputs you log at any one time.

- 1 Input logged – 3412 slots …. @ 1 minute logging = 56 hours 52 minutes storage
- 2 Inputs logged – 2362 slots .. @ 1 minute logging = 39 hours 52 minutes storage
- 3 Inputs logged – 1806 slots .. @ 1 minute logging = 30 hours 6 minutes storage
- 4 Inputs logged – 1462 slots .. @ 1 minute logging = 24 hours 22 minutes storage
- 5 Inputs logged – 1228 slots .. @ 1 minute logging = 20 hours 28 minutes storage
- 6 Inputs logged – 1058 slots .. @ 1 minute logging = 17 hours 38 minutes storage
- 7 Inputs logged – 930 slots …. @ 1 minute logging = 15 hours 30 minutes storage

15.15. Logged Data

- This area shows the data as it is retrieved from the wireless modem

- To understand how the Reference Date and Time is configured and used see ‘How the Reference Date and Referece Time is used’.

15.16. Frequency

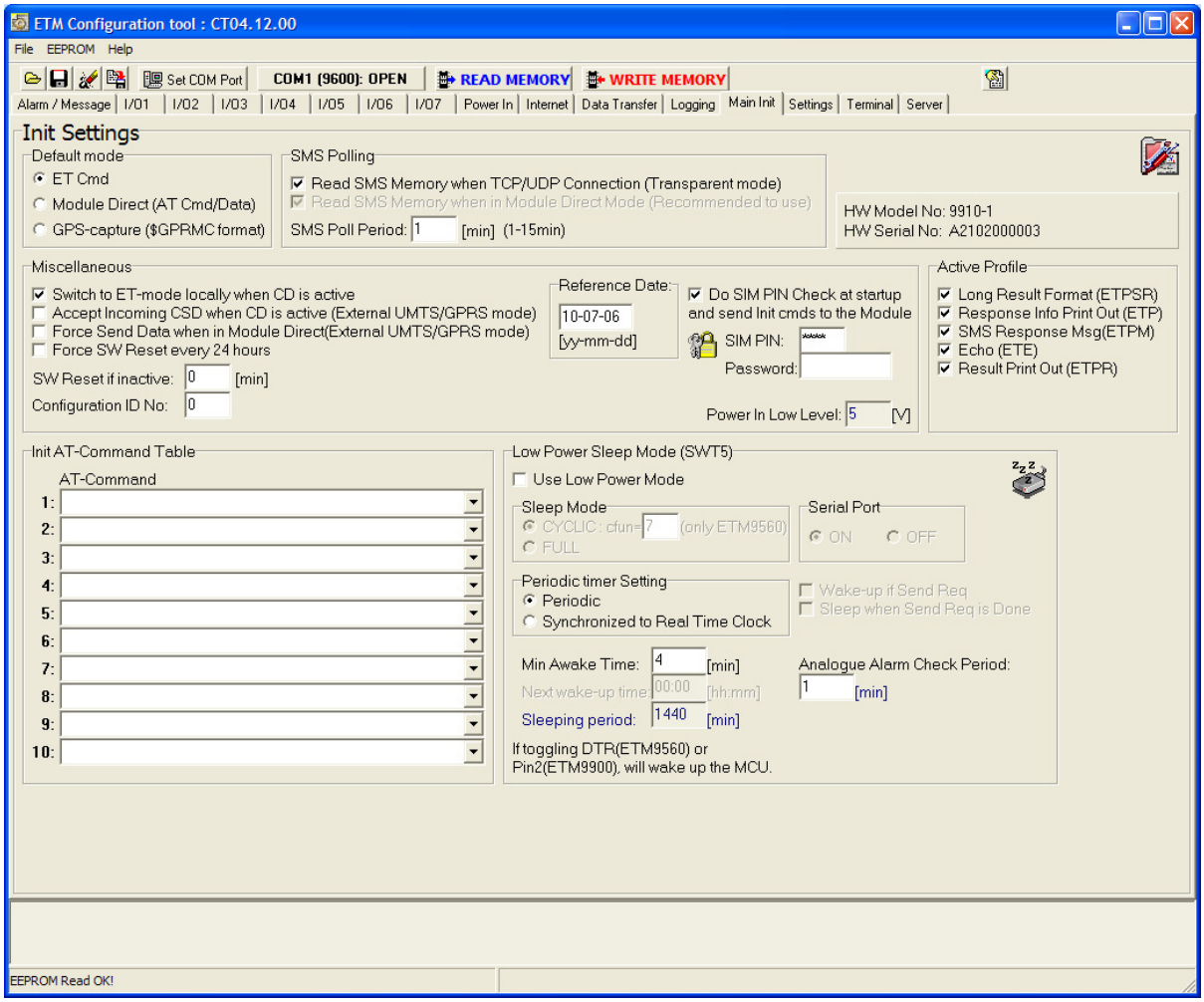
- If enabled the total pulse values (per the period set in SWT1) are divided by the period set in SWT1 so if SWT1 is set for 15 and there are 45 pulses you will see a value of 3.

- Where a normal counter increments, adds the total counts for the period to the last known total value, the use of the Frequency option results in a counter operating as a differential counter.

- The maximum counter frenquency possible is 90hz.

16. Main Init

16.10. This tab allow you to set up the various options of the modem itself.


ETM Configuration tool : CT04.12.00
File EEPROM Help
Set COM Port
COM1 (9600): OPEN
READ MEMORY
WRITE MEMORY
Alarm / Message I/01 I/02 I/03 I/04 I/05 I/06 I/07 Power In Internet Data Transfer Logging Main Init Settings Terminal Server
Init Settings
Default mode
ET Cmd
Module Direct (AT Cmd/Data)
GPS-capture ($GPRMC format)
SMS Polling
Read SMS Memory when TCP/UDP Connection (Transparent mode)
Read SMS Memory when in Module Direct Mode (Recommended to use)
SMS Poll Period: 1 [min] (1-15min)
HW Model No: 9910-1
HW Serial No: A2102000003
Miscellaneous
Switch to ET-mode locally when CD is active
Accept Incoming CSD when CD is active (External UMTS/GPRS mode)
Force Send Data when in Module Direct(External UMTS/GPRS mode)
Force SW Reset every 24 hours
SW Reset if inactive: 0 [min]
Configuration ID No: 0
Reference Date:
10-07-06
[yy-mm-dd]
Do SIM PIN Check at startup and send Init cmds to the Module
SIM PIN:
Password:
Power In Low Level: 5 [V]
Active Profile
Long Result Format (ETPSR)
Response Info Print Out (ETP)
SMS Response Msg(ETPM)
Echo (ETE)
Result Print Out (ETPR)
Init AT-Command Table
AT-Command
1: 2: 3: 4: 5: 6: 7: 8: 9: 10:
Low Power Sleep Mode (SWT5)
Use Low Power Mode
Sleep Mode
CYCLIC : cfun=7 (only ETM9560)
FULL
Serial Port
ON OFF
Periodic timer Setting
Periodic
Synchronized to Real Time Clock
Wake-up if Send Req
Sleep when Send Req is Done
Min Awake Time: 4 [min]
Next wake-up time: 00:00 [hh:mm]
Sleeping period: 1440 [min]
Analogue Alarm Check Period: 1 [min]
If toggling DTR(ETM9560) or Pin2(ETM9900), will wake up the MCU.
EEPROM Read OK!

16.11. Default Mode

12.42.10 When the unit powers up it can start in 3 modes;

- ET mode is standard operating mode
- In AT mode the unit behaves like a standard GSM/UMTS wireless modem where the user controls the EU3-P module directly without using the MCU.
- In GPS-capture mode data coming from a GPS connected to the serial interface is stored in the unit. The last position can be requested via SMS

and when used as alarm each message can have the position appended.

Note: If you select #5 in either SWT3 or SWT4 you MUST configure the unit to start in GPS mode otherwise the GPS feed will be ignored.

- When in GPS mode all normal ET mode functions are supported EXCEPT commands on the serial port as it is dedicated to receiving GPS data – all ET commands continue to work on SMS, UDP or TCP when in GPS mode.

16.12. Switch to ET-mode locally when CD is active

12.43.10 This means that the unit operates in ET command mode whenever a dial in connection is active. This is useful for programming the unit over a dial up connection.

NOTE: Incoming CSD calls are only possible on UMTS/WCDMA when the modem does not have an IP Address allocated (is not connected to the internet).

16.13. Both 'Read SMS Memory' options should generally be checked, though the lower checkbox will generally be greyed out.

16.14. Init AT-Command Table

12.44.10 Here you may set various initial commands that are executed at power up

16.15. Miscellaneous

- PIN code is used if you have set "PIN check on" code on the SIM-card you are using

- The use of a password adds additional security for units that are easily accessible (and therefore insecure)

16.16. Do SIM PIN Check at startup

- If this is checked, which it is the default configuration, the modem will check to see if the SIM PIN is required and if it is the SIM PIN as entered will be sent to the module

- If this option is unchecked then the modem will not check the SIM PIN nor will it send any of the commands listed in the AT-Command list – this mode is ONLY used when you are using the modem in Module Direct (AT Cmd/Data) configuration and the device connected to the serial port will enter the SIM PIN and will configure the modem using AT commands

16.17. Low Power Mode (SWT5)

- If the unit operates from a battery and you need to conserve power it can be set to wake up every 'x' minutes, for 'y' minutes, to send data etc.

- When the wireless modem wakes up if will scan the SWT timers and determine which timers are ready to trigger a data send.

- If an SWT timer is not ready to trigger a data send and the wireless modem wakes up then any sending for that timer will be ignored.

- What you should know about Low Power Mode;

  - One **VERY** important factor to consider when you you use LPM is that the wireless modem will only be awake for the period of time you configure, so you need to modify the SWT2, SWT3 and SWT4 timers so that they deliver data within the time that the wireless modem is awake – therefore if you have an awake time of **TEN** minutes you would set SWT2, SWT3 and SWT4 to a value that guarentees that the connections are made at least twice during the awake time.

    This means that an awake time of ten minutes should have four minutes as the SWT3, SWT4 and SWT4 time.

    The minimum value you should use for the SWT3, SWT4 and SWT4 timers is **TWO** minutes in **ANY** configuration (LPM or normal).

  - During Low Power Mode operation there is no contact with the network and so SMSs will be held in the carriers SMSC therefore you cannot guarantee the order in which SMSs will be delivered to the wireless modem..... this means that if you send an SMS to configure an option and send a reset then there is no guarentee which will be actioned first and as a reset can cause the wireless modem to restart without consideration of any other activity on the wireless modem you might find that your second (configuration) command 'gets lost' so you need to plan accordingly

- During Low Power Mode operation a change on a configured I/O that would normally cause an alert to occur will cause the unit to wake up, the IOs are scanned every minute in Low Power Mode, and so there is no guarentee that a unit will stay in Low Power Mode for as long as expected.

- If an external client device, processor or a simple switch, changes the state of Pin2 on the power connector then the wireless modem will come out of Low Power Mode.

- You should configure enough awake time so that the wireless modem can complete any tasks that you have set such as delivering #21 data or accepting commands using a #8 connection.

- You can change the Low Power Mode times using an SMS, direct connection to the serial port or when connected to the wireless modem socket either directly or by #8.

16.18. Use Low Power Mode

12.45.10 Check or uncheck this option to enable or disable LPM mode

16.19. ETM 957x Only: Sleep Mode

12.46.10 CYCLIC whould be set as 7 – this means that in this mode the module wakes up directly instead of the normal ~30sec wake-up time.

Note: In this mode the wireless modem will consume slightly more power in LPM as the internal module is still connected to the network.

12.47.10 FULL will cause the wireless modem to power off the internal module resulting in the greatest power saving in LPM.

16.20. Serial Port

12.48.10 This option allows the serial port to be turned off when in LPM to save power.

12.49.10 Clients who wish to save more power can use this option BUT anytime that the serial port is needed to change configuration the client will need to;

12.50.10 Power cycle the wireless modem and use the ESC method of configuration

12.51.10 Use ET commands in #8 mode

12.52.10 Use ET commands over TCP or UDP in direct access (VPN) mode

16.21. Periodic Timer Setting

12.53.10 Refer to the description of Periodic versus Synchronizes to Real Time Clock in the 'Internet Data Transfer' section for a description of the differences between these two timing methods

16.22. Wake-up if Send Required

12.54.10 If checked the wireless modem will only wake-up when there is something to send

Note: This setting is usually not checked – contact ETM Pacific Support if you need further information about this setting.

16.23. Sleep when 'Send Required' is done

12.55.10 If checked the wireless modem will go back to sleep immeadiatly when sending is completed

Note: This setting is usually not checked – contact ETM Pacific Support if you need further information about this setting.

16.24. Min Awake Time

12.56.10 This setting is configured within this text entry box – you set the minimum period of time that the wireless modem should stay awake for.

12.57.10 The wireless modem may be busy performing configured operations and so exceed the time value entered here but once the configured interval has expired and the wireless modem has been inactive for a short period it will automatically switch to LPM mode.

16.25. Next wake-up time

- This information is 'display only' and is only relevant if you are using Synchronized to Real Time Clock.

- Displayed is the next time that the wireless modem will wake up if LPM is enabled.

12.58.10 This time value is changed using LPM and you should refer to the 'Internet Data Transfer' section for a description of this time value.

16.26. Sleeping Period (SWT5)

- This information is 'display only' and is relevant if you are using Periodic or Synchronizes to Real Time Clock.

- Displayed is the total time that the wireless modem will sleep if LPM is enabled.

1. The LPM mode timer, SWT5, works in the following manner;

    - The 'Sleeping Period' defines the total interval that the wireless modem works with in determining when to wake up.

    - The 'Min Awake Time' defines the minimum interval that the wireless modem is awake for within the 'Sleeping Period'.

    - So to describe the capability we imagine that the 'Sleeping Period' is set for 60 minutes and the 'Min Awake Time' is set for 10 minutes and that the wireless modem is turned on for the first time at 00:00,

        - The wireless modem starts at 00:00, performs as expected (connects to the network) and then after all configured sending takes place and the 'Min Awake Time' has expired the wireless modem will switch to LPM mode very shortly after 00:10

        - The wireless modem wakes from LPM at 01:00 and performs the same steps as in 1 – once the wireless modem determines that the internal timer is at 01:10 it will switch to LPM as soon as possible.

        - The wireless modem will continue to perform in this manner indefinately.

- Analogue Alarm Check Period

- If the wireless modem is in LPM then the scanning interval of the analogue inputs can be increased by changing this from every minute to every <x> minutes.

- This reduction in scanning interval can further add to the power saving capabilities of the wireless modem as the action of scanning an Analogue input requires a small power burden when the Analogue inputs are powered up to take a reading.

- We recommend that unless you specifically want to use this feature, as it has an impact on the scanning for all inputs, you leave the value at 1. The value as entered is a multiplier of the Scanning Interval (for LPM) so you need to considere whether you want to increase the time between scans on Analogue inputs when you use this capability).

- DTR and I/O2 (99xx) Powerup toggling

- 9570: In LPM the wireless modem can be woken up by toggling the DTR pin on the RS232 connector.

- 99xx: In LPM the wireless modem can be woken up by grounding pin 2 on the POWER connector.

- This feature allows an external processor / capability to wake the wireless modem up so that either some action can be performed or so that the wireless modem can be made to conect to an external server (these actions or external connections are based on wireless modem configurations and client capabilities)

16.27. Active profile

12.59.10 The Active Profile allows you to control the way that the wireless modem responds to the terminal in normal use.

- **Echo (ETE)**

  This sets whether the wireless modem echos commands

Options are;

- ETE1 – Echo commands
- ETE0 – Do not echo commands

Note: This has no affect when in AT Mode and you should set ATE1 after the modem has fully initialised.

- **Response Info Print Out (ETP)**

This sets whether the modem echos information messages

Options are;

- ETP1 – Echo information messages
- ETP0 – Do not echo information messages

1. **Result Print Out (ETPR)**

This sets whether the modem echos result messages

Options are;

- ETP1 – Echo result messages
- ETP0 – Do not echo result messages

2. **Long Result Format (ETPSR)**

This sets the message format

Options are;

- ETSR1 – Echo long format text messages
- ETSR0 – Echo short format numeric code messages

3. **SMS Response Msg (ETPM)**

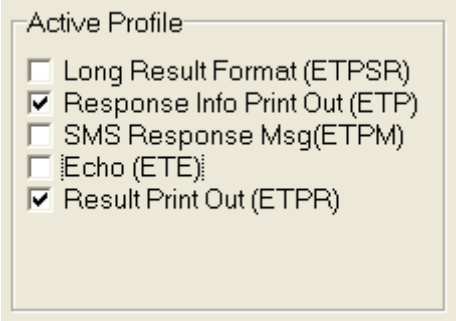
This sets whether or not the wireless modem will send an SMS answer when you send an SMS to the wireless module.

Options are;

- ETPM1 – Message send on
- ETPM0 – Message send off

4. If you uncheck all the options in the Active Profile you will not see any responses from the wireless modem – including when the wireless modem is first turned on.

5. For normal AT mode operation you would have the following options checked;



6. This would result in the following output from the wireless modem:

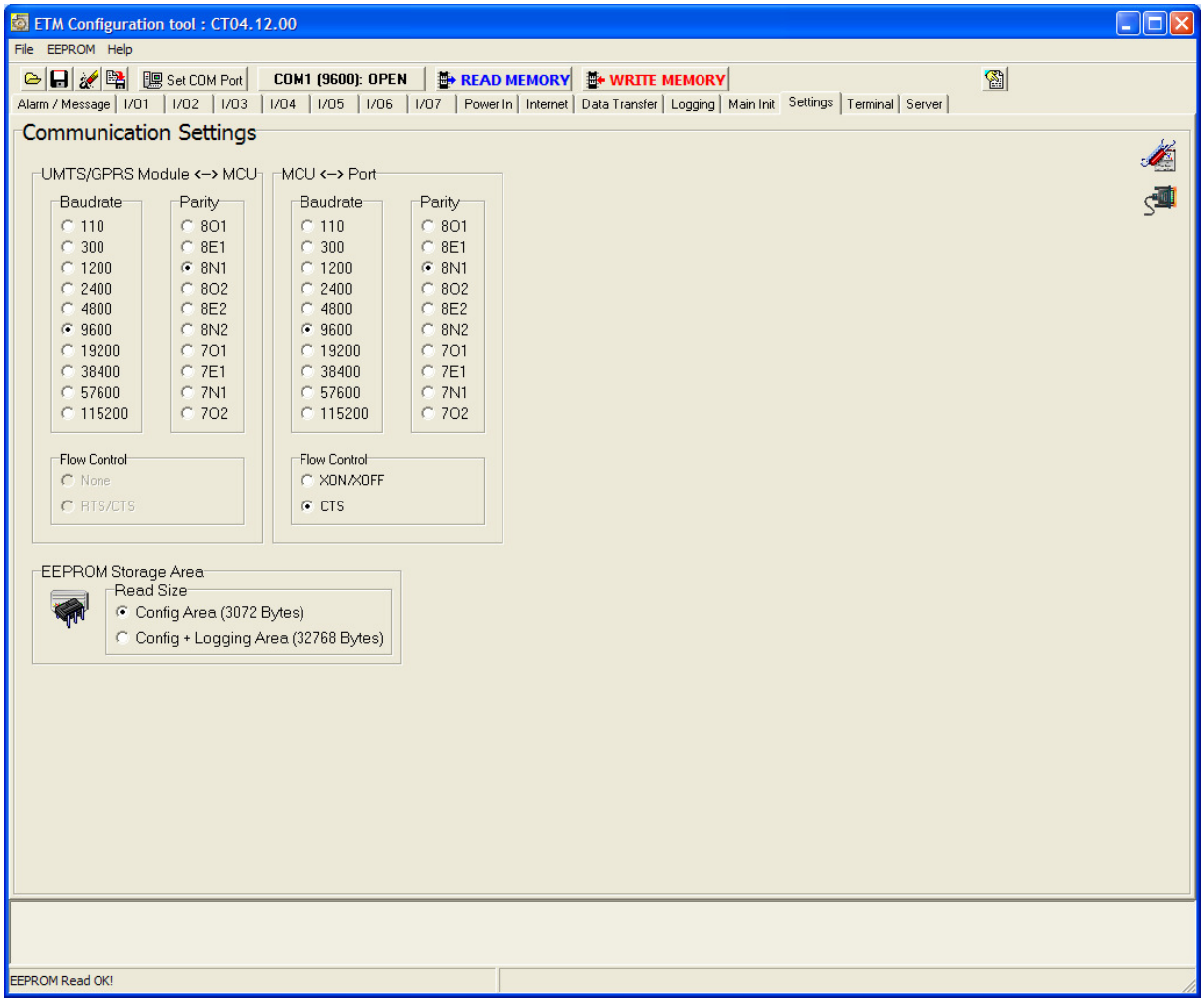
ETM9910 SYSTEM START
10
SIM READY
Registered, roaming
Net Provider:"3TELSTRA"
Signal Quality:-85dBm(14)"Low"
Signal Quality:-85dBm(14)"Low"
Signal Quality:-85dBm(14)"Low"
SMS Message Service OK
SIM:SMS Central no:+61418706700
SUPPL VOLT:15.62V

- The wireless modem would be ready to use once the 'SUPPL VOLT:' message was received

7. For a normal modem you would have all options checked.

17. Serial Communications (Module and Modem)

17.10. This tab allows you to setup the speed of the serial port.


ETM Configuration tool : CT04.12.00
File EEPROM Help
Set COM Port
COM1 (9600): OPEN
READ MEMORY
WRITE MEMORY
Alarm / Message I/01 I/02 I/03 I/04 I/05 I/06 I/07 Power In Internet Data Transfer Logging Main Init Settings Terminal Server
Communication Settings
UMTS/GPRS Module <--> MCU
MCU <--> Port
Baudrate
Parity
110 300 1200 2400 4800 9600 19200 38400 57600 115200
8O1 8E1 8N1 8O2 8E2 8N2 7O1 7E1 7N1 7O2
Flow Control
None RTS/CTS
XON/XOFF CTS
EEPROM Storage Area
Read Size
Config Area (3072 Bytes)
Config + Logging Area (32768 Bytes)
EEPROM Read OK!

17.11. Communication Settings

17.6.11 Module <--> MCU should match MCU <--> Port

17.7.11 MCU <--> Port sets the serial port on the wireless modem and should be adjusted to suit the client device connected to the port.

1. *Both these settings must be exactly the same – you should only ever set them differently after contacting ETM Pacific Support to discuss your requirements.*

17.8.11 Flow Control

1. You can select CTS (hardware) or Xon/Xoff flow control for the RS232 port.

17.9.11 EEPROM Storage Area

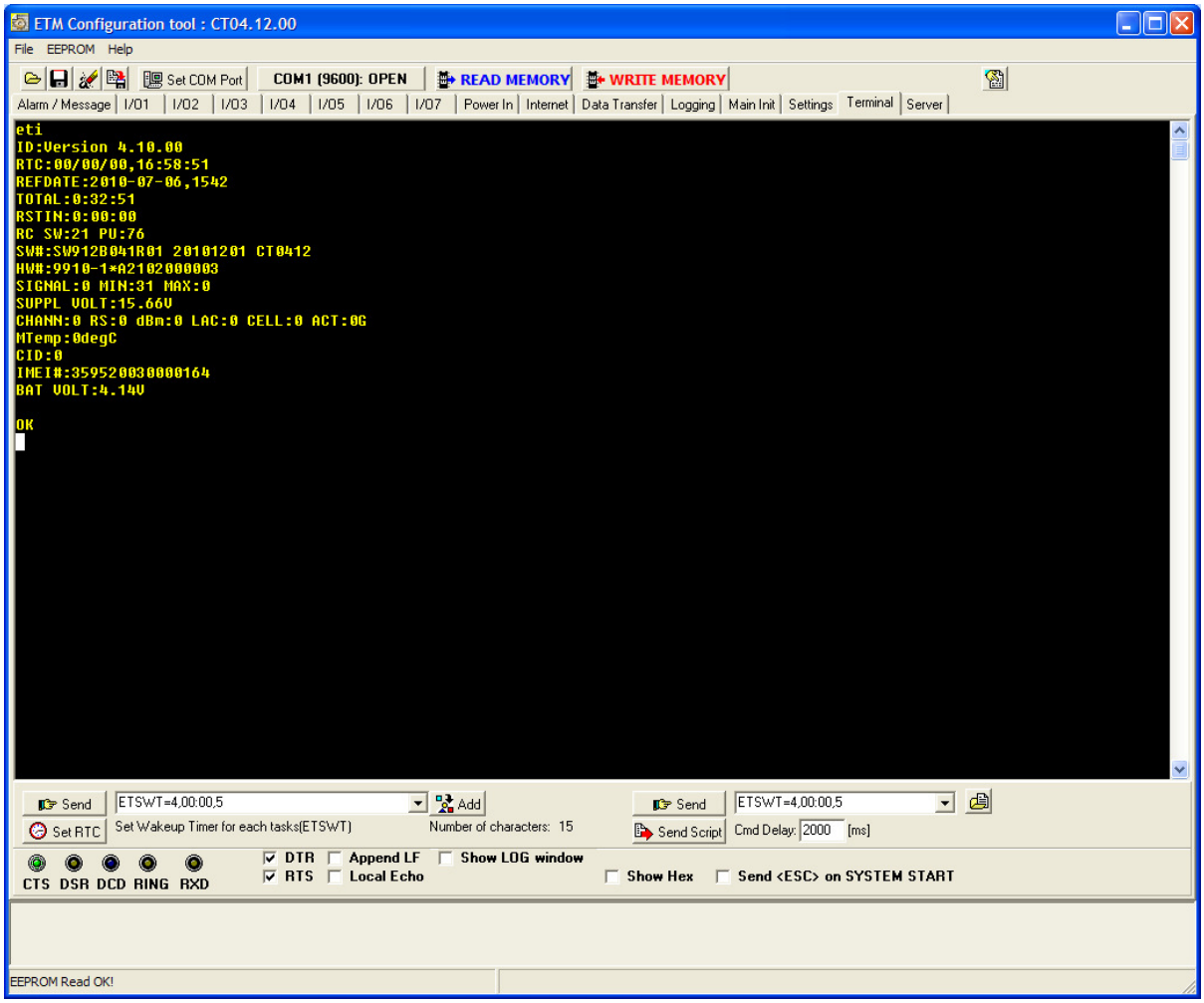
1. This should be ‘Config Area’

18. Terminal

18.10. In the terminal window you can see the output from the unit and type commands to the unit.

Note: Remember to place the cursor inside the window before you type any commands.

You need to see the flashing cursor within the terminal window before you can be sure that anything you type will be sent to the modem.



18.11. Entering command mode

18.6.11 Place the cursor inside the black window and press “escape” to stop the start up sequence. You may also issue ET-commands in operation mode but the unit might be busy and fail to execute the command. Make sure to set baud rate to 9600 for the escape sequence to work.

18.12. Send – commands

18.6.12 You can select a number of predefined commands by using the drop down menu. Not all commands are listed here. Note that each command has a short description. For full details refer to the ET Command list document.

18.13. Flow Control

1. You can change the state of the flow control pins associated with the PC if required by unchecking and checking the RTS/DTR options.

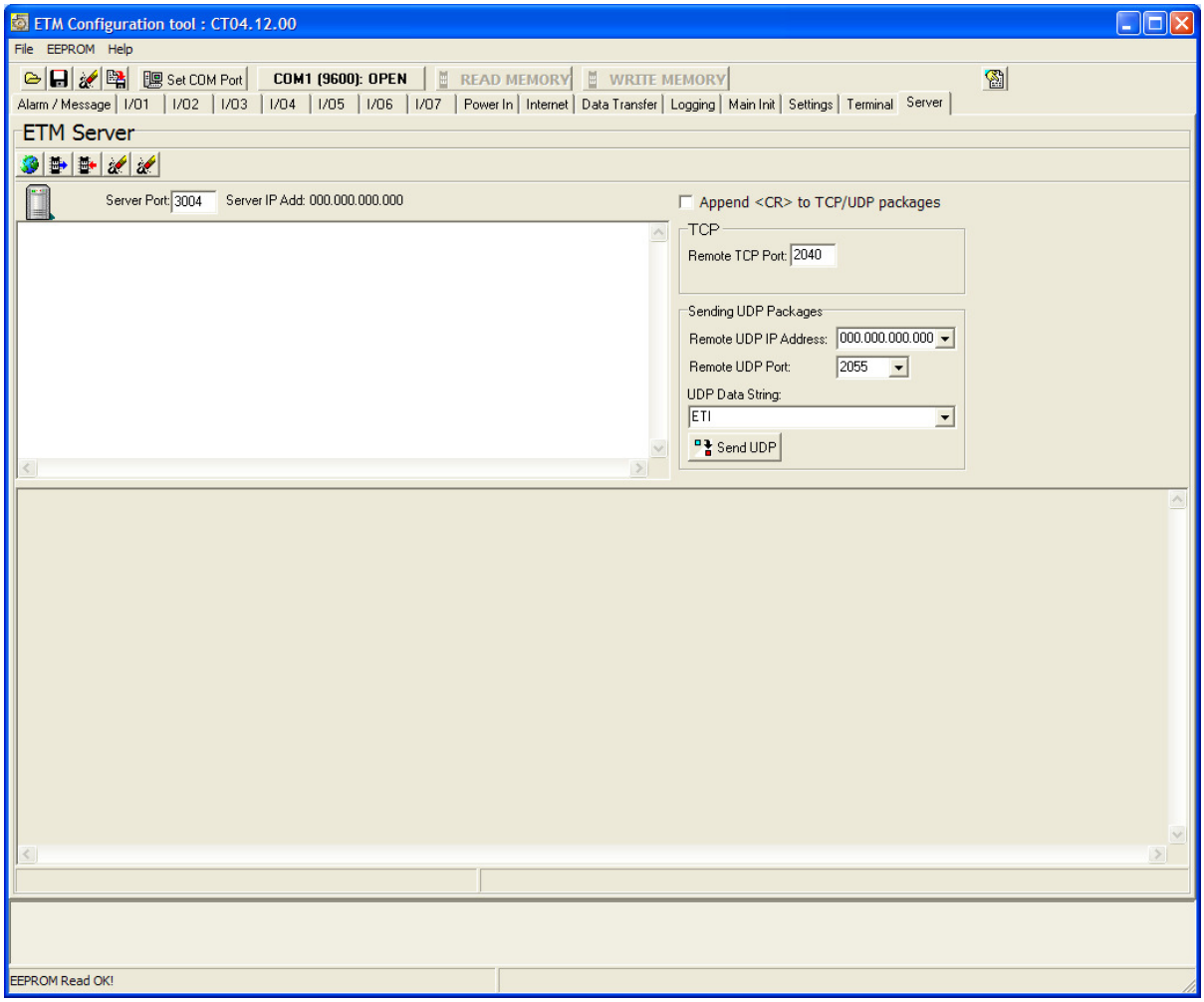
18.14. You can turn on local terminal echo by checking the 'Local Echo' checkbox if your modem has echo turned of and you need to see the commands you are typing.

18.6.14 To show the log window check the 'Show LOG Window checkbox'

If you don't want the timing details in the log window then uncheck 'Log with Time Stamp' which is only visible when you have 'Show LOG Window' checked.

19. Server

19.10. This screen emulates a TCP and UDP client.



19.11. For detailed instructions on using this tab please contact ETM Pacific Support.

20. ETM Supplied Java 'SimpleServer'

20.10. ETM Pacific can supply a rudimentary java receiver for the wireless modem (source code included) but the following points are relevant for any implementation.

20.6.10 When using NAT, as most carriers are providing, you don't have any available port mappings to access the wireless modem from the Internet and so you need to confgure one of the SWT timers to connect to your own fixed Internet address and port and then to use the;

#8 ET – Command Response

.... option which will allow your server code to communicate directly with the wireless modem as though it were plugged into the serial port.

You have up to 30 seconds to send a command to the wireless modem (using #8) otherwise the wireless modem will disconnect the socket.

One very important thing to note is that if you set a #8 option on any SWT timer you **MUST** have a receiver on the configured Internet address able to connect to the wireless modem and issue at least an ET command otherwise the wireless modem will continue to attempt to connect indefinately or until the module goes into sleep mode if configured..... this could COST YOU A LOT OF MONEY.

20.7.10 If you have a VPN or can directly access the IP address of the wireless modem then you can open a socket to port 2055 on the wireless modem and any command that starts with ET will be processed as an ET command and any other received data will be sent transparently to the serial port.

20.8.10 There is no error checking on transmitted data so while you can use UDP to reduce costs you would be better served by using TCP which has more reliability

20.9.10 While the wireless modem is in sleep mode or is disconnected from the network there is no way to contact the wireless modem

20.10.10 You can send an SMS to the wireless modem to get it to reconnect to the network, if it is disconnected, but you cannot wake the unit up with an SMS.

20.11. If you require a copy of the SimpleServer please email support@etmpacific.com.au.

21. Low Power Mode Functional Description

21.10. This is a breakdown of the operation of LPM giving you information from the log from an in-service modem.

TS:11:06:39.87 - MS:^SYSSTART
TS:11:06:47.87 - SIM READY
TS:11:06:50.87 - Registered, roaming
TS:11:06:53.87 - Net Provider:"3TELSTRA",2
TS:11:06:56.87 - Signal Quality:-89dBm(12)"Low"
TS:11:06:59.87 - Signal Quality:-89dBm(12)"Low"
TS:11:07:02.87 - Signal Quality:-89dBm(12)"Low"
TS:11:07:06.01 - SMS Message Service OK
TS:11:07:06.62 - SIM:SMS Central no:+61418706700
TS:11:07:07.73 - SUPPL VOLT:13.58V
TS:11:07:09.01 - Modem Init:at+cgdcont=1,"ip","telstra.internet"
TS:11:07:09.48 - Init OK
TS:11:07:09.48 - Connect:atd*99***1#
TS:11:07:09.71 - ISP Connect
TS:11:07:11.68 - PAP Login OK
TS:11:07:23.65 - Waiting for IP-Context
TS:11:07:23.67 - Local IP Address:10.161.11.119
TS:11:07:28.65 - MSG:INTERNET CONNECT
< System has started >
< Opening 203.194.26.238 for port 2068 >
TS:11:07:28.65 - Connecting RIP:203.194.26.238:2068
TS:11:07:28.79 - LP:2800
TS:11:07:28.79 - MSG:SOCKET OPEN[!]
TS:11:07:36.15 - MSG:SOCKET CLOSED
< Closing 203.194.26.238 for port 2068 >
< Opening 203.194.26.238 for port 2068 >
TS:11:07:36.15 - Connecting RIP:203.194.26.238:2068
TS:11:07:36.28 - LP:2150
TS:11:07:36.29 - MSG:SOCKET OPEN[!]
TS:11:07:43.65 - MSG:SOCKET CLOSED
< Closing 203.194.26.238 for port 2068 >
< Opening 203.194.26.238 for port 2068 >
TS:11:07:59.15 - Connecting RIP:203.194.26.238:2068
TS:11:07:59.15 - LP:2150
TS:11:07:59.40 - MSG:SOCKET OPEN[!]
TS:11:08:07.15 - MSG:SOCKET CLOSED
< Closing 203.194.26.238 for port 2068 >
< Opening 203.194.26.238 for port 2068 >
TS:11:08:07.15 - Connecting RIP:203.194.26.238:2068
TS:11:08:07.40 - LP:2800
TS:11:08:07.42 - MSG:SOCKET OPEN[!]
TS:11:08:15.15 - MSG:SOCKET CLOSED
< Closing 203.194.26.238 for port 2068 >

TS:11:08:48.79 - LPM:ON (11:06:39 ON and 11:08:48 OFF = approx. 2 Minutes)
TS:11:11:48.65 - LPM:OFF (11:08:48 OFF and 11:11:48 ON = 3 Minutes)

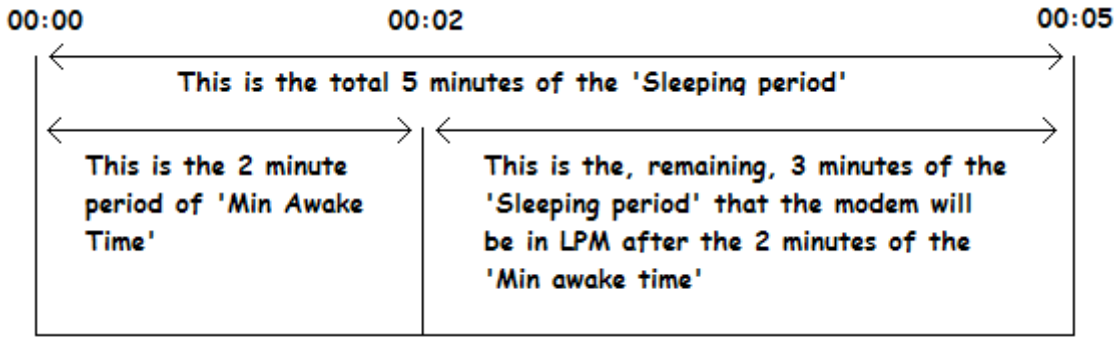
... therefore we have a 5 minute sleeping period with a 2 minute period within that sleeping period where the 9910 is awake.

TS:11:11:57.39 - MS:^SYSSTART
TS:11:12:07.39 - SIM READY
TS:11:12:09.39 - Registered, roaming
TS:11:12:11.39 - Net Provider:"3TELSTRA",2
TS:11:12:13.39 - Signal Quality:-81dBm(16)"Medium"
TS:11:12:16.59 - SMS Message Service OK
TS:11:12:17.18 - SIM:SMS Central no:+61418706700
TS:11:12:19.07 - Modem Init:at+cgdcont=1,"ip","telstra.internet"
TS:11:12:19.53 - Init OK

TS:11:12:19.56 - Connect:atd*99***1#
TS:11:12:19.78 - ISP Connect
TS:11:12:21.71 - PAP Login OK
TS:11:12:33.67 - Waiting for IP-Context
TS:11:12:33.68 - Local IP Address:10.236.214.250
TS:11:12:38.68 - MSG:INTERNET CONNECT
< System has started >
< Opening 203.194.26.238 for port 2068 >
TS:11:12:38.81 - Connecting RIP:203.194.26.238:2068
TS:11:12:38.82 - LP:2800
TS:11:12:46.15 - MSG:SOCKET OPEN[!]
TS:11:12:46.18 - MSG:SOCKET CLOSED
< Closing 203.194.26.238 for port 2068 >
< Opening 203.194.26.238 for port 2068 >
TS:11:12:46.37 - Connecting RIP:203.194.26.238:2068
TS:11:12:46.39 - LP:2150
TS:11:12:53.65 - MSG:SOCKET OPEN[!]
TS:11:12:53.68 - MSG:SOCKET CLOSED
< Closing 203.194.26.238 for port 2068 >
< Opening 203.194.26.238 for port 2068 >
TS:11:13:09.17 - Connecting RIP:203.194.26.238:2068
TS:11:13:09.17 - LP:2150
TS:11:13:09.43 - MSG:SOCKET OPEN[!]
TS:11:13:17.17 - MSG:SOCKET CLOSED
< Closing 203.194.26.238 for port 2068 >
< Opening 203.194.26.238 for port 2068 >
TS:11:13:17.17 - Connecting RIP:203.194.26.238:2068
TS:11:13:17.17 - LP:2800
TS:11:13:17.46 - MSG:SOCKET OPEN[!]
TS:11:13:25.17 - MSG:SOCKET CLOSED
< Closing 203.194.26.238 for port 2068 >
< Opening 203.194.26.238 for port 2068 >
TS:11:13:47.25 - Connecting RIP:203.194.26.238:2068
TS:11:13:47.25 - LP:2150
TS:11:13:49.40 - MSG:SOCKET OPEN[!]
TS:11:13:56.67 - MSG:SOCKET CLOSED
< Closing 203.194.26.238 for port 2068 >
< Opening 203.194.26.238 for port 2068 >
TS:11:13:56.67 - Connecting RIP:203.194.26.238:2068
TS:11:13:56.67 - LP:2800
TS:11:13:56.84 - MSG:SOCKET OPEN[!]
TS:11:14:04.17 - MSG:SOCKET CLOSED
< Closing 203.194.26.238 for port 2068 >

TS:11:14:50.81 - LPM:ON (11:11:57 ON and 11:14:50 OFF = 3 Minutes)
TS:11:16:48.68 - LPM:OFF (11:14:50 OFF and 11:16:48 ON = 2 Minutes)

TS:11:16:57.43 - MS:^SYSSTART


00:00
00:02
00:05
This is the total 5 minutes of the 'Sleeping period'
This is the 2 minute period of 'Min Awake Time'
This is the, remaining, 3 minutes of the 'Sleeping period' that the modem will be in LPM after the 2 minutes of the 'Min awake time'

21.11. The wireless modem sleep mode functionality works on a reoccurring interval and so the ‘sleeping period’ defines the (approximate) maximum time that the wireless modem waits between waking up and the ‘Min awake time’ is the (approximate) timeframe within that defined ‘sleeping period’ that the wireless modem can send the data (be awake). The timeframe for this value always starts when the modem wakes up.

21.12. There is some variation possible within the wireless modem so that while you set a 'Min awake time' of 2 minutes it is possible that the unit will stay awake longer (up to 1 minute) because the wireless modem did not finish all the required tasks within the allocated timeframe.

21.13. This will be more apparent the more you have chosen to send because each individual send will take a finite amount of time and if, for example, you set an awake time that is too short for the sending of #21, #5 and #4 data the wireless modem will wait for the next internal timer interrupt and if the 'Min awake time' has expired then a final send may be undertaken and then the wireless modem would move immediately to LPM:OFF – when you see this in the log you could assume that the wireless modem had performed the required tasks incorrectly when it had in fact done the best that it could do based on the configuration.

21.14. So you need to remember that the 'Min awake time' is the time from when the wireless modem starts up until all required tasks are completed and then the 'sleeping period' is the time from when the wireless modem wakes up, goes to sleep again and then wakes up again (see graphic above). Therefore the 'sleeping period' includes the 'Min awake time' – so you should not expect that the 'Min awake time' is after the 'sleeping period'.

21.15. One final thing…… in general operation we would not expect to see a 'sleeping period' of less than an hour so if you test a 'sleeping period' of 5 minutes with a 'Min awake time' of 2 minutes then it is not going to give you a valid representation of what the wireless modem is doing. Most of our clients have 'sleeping period' set to 1440 and 'Min awake time' set to 4 or 6 minutes as they use LPM to save as much battery as they can.

22. Real Time Clock and Reference Date

22.10. This describes the concept behind the Real Time Clock and Reference Data and is an important aspect of the operation of the modem to understand if you need the correct date and time on alerts or internet data.

22.6.10 Reference Date Description

1. The wireless modem uses the reference date as a base to time and date any subsequent alarms or data that is processed.

2. The reference date is used in the following manner;

   - A reference date of 07-01-01 is set

     This means that the initial start date of any record or alert is the 1st of January 2007

   - Any alert, logged data will make use of the reference date

22.7.10 Real Time Clock Details

1. The wireless modem will use the real time clock as an incrementing value to add to the reference date for any alarms or data that is processed.

2. The real time clock is used in the following manner;

   - A reference date of 07-01-01 was set

     This means that the initial start date of any record or alert is the 1st of January 2007

   - A real time clock of 0:12:00:00 is set which means that the 'effective' clock in the wireless modem started at midday '12:00:00' + 0 days (the value before the colon in the real time clock value) from the reference date of 1st of January 2007

   - So let us assume that the wireless modem logs it's first alert approx. 1 hour after it starts, the known RD would be 07-01-01. and so the 'current' real time clock in the wireless modem would now be 0:13:00:00.

- After the real time clock has passed x:00:00:00 the x would increment by one (because another day had passed) and so you would now add one day to the reference date to get the current date within the wireless modem.

12.60.10 The wireless modem knows nothing of daylight saving nor does it know anything about the count of days in the month or years….. so you need to convert the delivered real time clock to the correct date and time.

12.61.10 In VB6 you would do this with the following function;

```
Public Function ConvertRDRTC(ByRef strDateSupplied As String, ByRef
strRefDate As String) As Double

    Dim dblBase As Double
    Dim strDateSplit

    strDateSplit = Split(strDateSupplied, ":", 2)

    dblBase = CDbl(DateSerial(CInt("20" & Mid(strRefDate, 1, 2)), _
        CInt(Mid(strRefDate, 4, 2)), _
        CInt(Mid(strRefDate, 7, 2)))) + _
        TimeSerial(CInt(Mid(strDateSplit(1), 1, 2)), _
        CInt(Mid(strDateSplit(1), 4, 2)), _
        CInt(Mid(strDateSplit(1), 7, 2)))

    ConvertRDRTC = CDbl(DateAdd("d", strDateSplit(0), dblBase))

End Function
```

- You would call the function like this;

```
Dim DblReturn as Double
DblReturn = ConvertRDRTC("1:12:13:14", "07-01-01")
```

... and you would get 39084.5091898148 as a return value which a CDate() would convert to 02/01/2007 12:13:14 which is ‘one day after the ref date with a time of 12:13:14’.

23. Accessing AT Mode from ET Mode

23.1. In some circumstances access is required to AT Mode while the modem is operating in ET Mode and the following is a step by step description of how to change from ET Mode from AT Mode.

Note: Whenever you send the +++ or --- commands you MUST leave more than 1 second of delay on either side of the sequence for the modem to recognise it as a command otherwise the modem will intepret the sequence as normal data.

23.1.1 On the serial port send

…(that is three minus symbols) to the modem and it will respond with OK. This makes sure that you have the ET Command Processors attention.

23.2.1 On the serial port send

ETSC1

… and the modem will respond with OK. You now have, effectively disconnected from the internal processor but need to do more steps to gain access to the EU3-P module.

23.3.1 Lower then Raise RTS (if you are using the Configuration Tool you can do with with the checkbox on the lower left of the terminal).

23.4.1 On the serial port send

+++

… and the modem will respond with OK.

23.5.1 You are now talking to the EU3-P module and can interact with it in any way you require BUT during this time the internal processor in the wireless modem cannot use the module concurrently so all sending of data and alerting is halted.

23.6.1 To return to ET Mode send, on the serial port

+++

… and the modem will respond with OK.

23.7.1 On the serial port send

ATO

… and the modem will respond with CONNECT

23.8.1 On the serial port send:

--- …(that is three minus symbols) to the modem and it will respond with OK.

23.9.1 Now the wireless modem is fully back in ET Mode.

24. I/O 7 Toggling

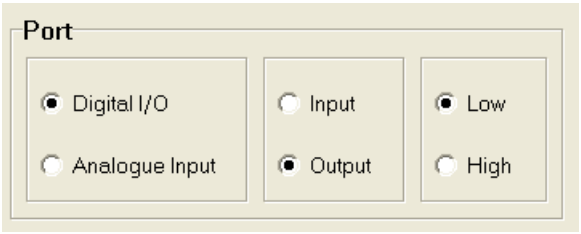
23.2. The wireless modem has the capability to toggle I/O 7 (if configured in the Logging Tab – which implies that Logging must be enabled for this capability to work) to turn on Analogue sensors or to enable other types of external client devices to be used when logging.

23.3. Steps to use this capability;

23.1.3 On the Logging Tab in the Channels to log section locate and check the following option.

23.2.3 On the Logging Tab in the Channels to log section locate and uncheck the following option.

23.3.3 On the I/O 7 Tab locate and check the following options.



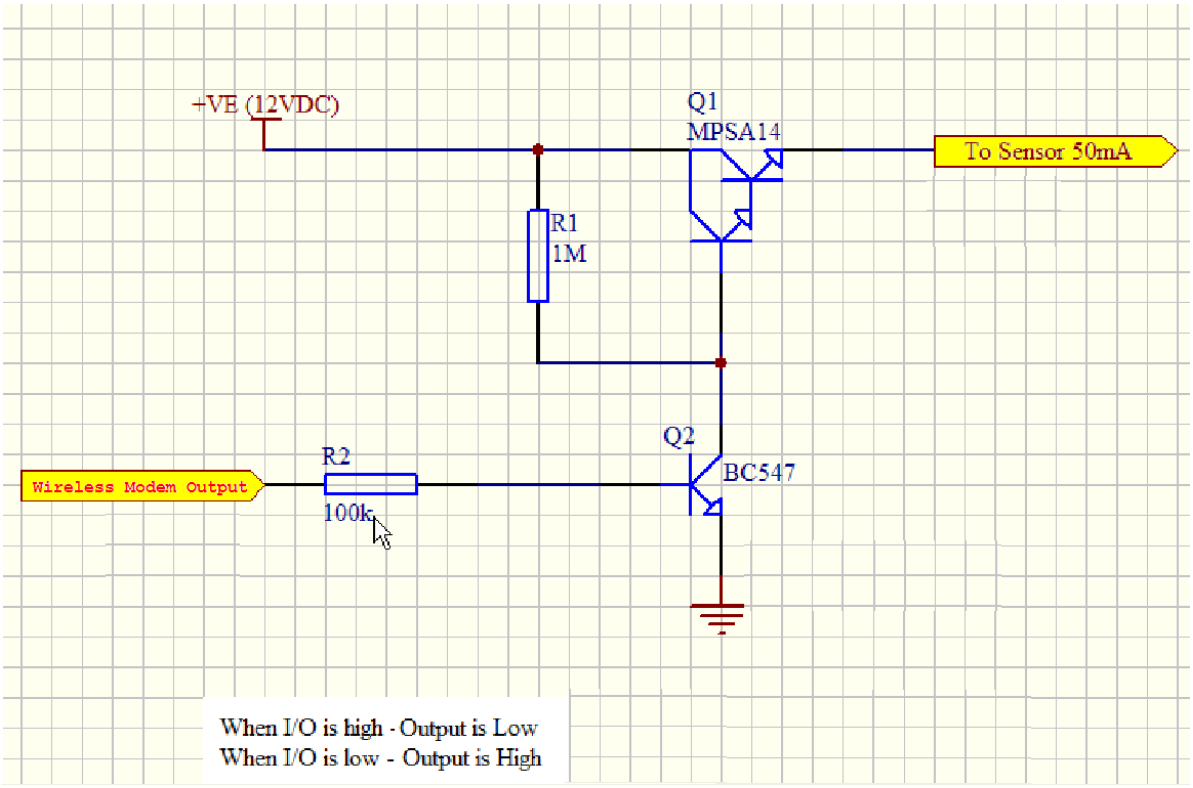
- Note: You should set the state of the output to either Low or High as an intial state – the wirelessa modem will tooggle the output to the opposite state when appropriate.

23.4.3 On the I/O 7 Tab locate and read the following.

Note: If using I/O7 toggling;
I/O7 will toggle30 sec before logging when the MCU is in logging mode.
Or every minute when scanning for Analogue Alarm in Awake mode,
or every n*minute when scanning for Analogue Alarm in Sleep mode,

23.5.3 If required, when using LPM, locate and set the following value in the Main Init Tab in the Low Power Sleep Mode (SWT5) section.

23.6.3 You cannot drive a sensor or a relay directly from the output so you can either purchase a Relay Board from ETM Pacific Pty Ltd or you could build a ciruit similar to the following (we do not offer support for circuit design so you should ascertian for yourself whether a circuit is appropriate for your use or not).



25. Hardware Description

25.6.3 Power connector

25.7.3 A Modular 6/6, is used for Power and I/O connection.

25.8.3 The power supply connector is located on the right on the front side of the circuit board. It's a standard, female RJ12 type connector with 6 pins

Figure 6. The power supply connector with numbering and picture.

25.9.3 The table below shows in detail the pin assignment and function of each pin in the connector.

Pin	Function
1	Power Supply (+6V to 35V)
2	Not Used
3	Flash Download
4	DTR(can be used as wake-up pin)
5	Not Used
6	GND

Table 4. Allocation of pins in the power supply connector.

25.10.3 Normally only the Power Supply adapter is connected to power connector.

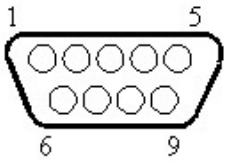
25.11.3 However, while flash loading and debugging, the bootstrap box is connected here first.

25.12.3 The power supply is then connected to the Bootstrap box.

25.13.3 To activate the flash download of the modem a low is appllied to power pin 3.

25.14.3 Serial Port Connector

25.15.3 The Serial Port connector is located in the middle on the front side of the ETM9800 circuit board. It's a standard female D-Sub connector with 9 pins.



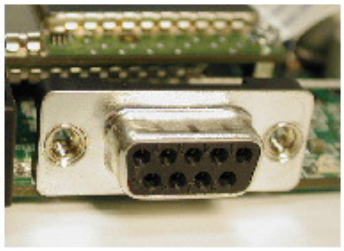


Figure 7. Serial port connector with pin numbering and picture.

Pin	Function
1	DCD Out
2	RXD Out
3	TXD In
4	DTR In
5	GND
6	DSR Out
7	RTS In
8	CTS Out
9	RING Out

Table 5. Allocation of pins in the serial port.

25.16.3 SIM Card connector and holder

25.17.3 There is a SIM card connector on the secondary side of the wireless modem board. You need a valid SIM card to be able to operate the GSM/GPRS/UMTS/HSDPA feature. Use a regular 3V SIM card.

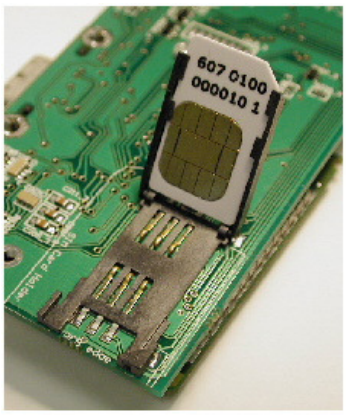


Figure 9. Picture of SIM card holder for 3V type of SIM card.

25.18.3 The holder can be opened and the SIM card is then inserted and snapped into place.

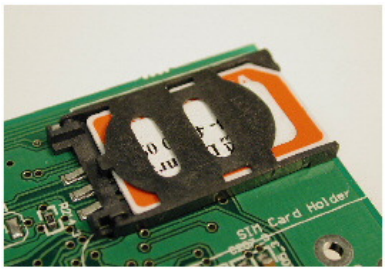


Figure 10. Picture of SIM card snapped into place.

25.19.3 In the picture above the SIM card is locked in place. The picture below shows how the SIM card is accessed when the circuit board is mounted in a case.

Figure 11. Access of SIM card on an assembled wireless modem.

25.20.3 The picture above shows how the SIM card holder has been raised in an upward position. In this position the SIM card can easily be inserted or removed in the holder.

25.21.3 Visual indication front LEDs

25.22.3 The three LEDs are mounted between the serial connector and the power connector as the picture below shows.

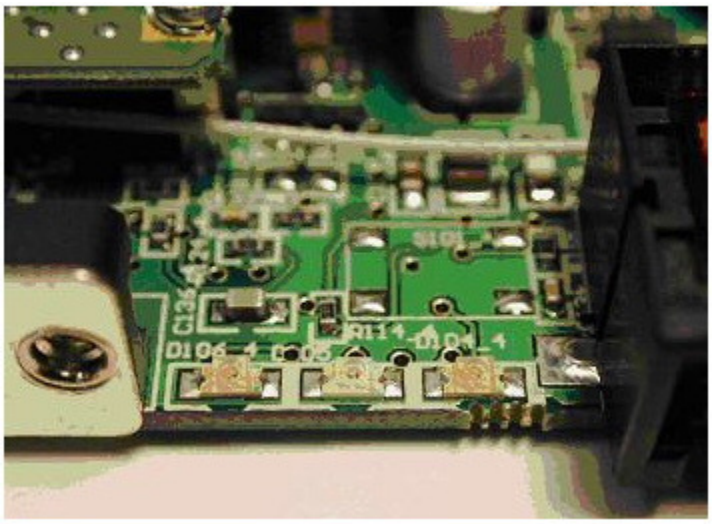
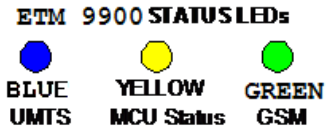


Figure 3. Picture of the LEDs.

25.23.3 LED Status indication

25.24.3 All LEDs will flash once during power on.



25.25.3 LED indication during runtime

25.26.3 BLUE – Status 1 LED signal from the EU3-P module. LED is flashing when the ME is registered to the UMTS network and either awake or in power saving state.

25.27.3 YELLOW – Busy with communication and waiting for answer from the Module. Socket Established indication.

25.28.3 GREEN – Status 0 LED signal from the EU3-P module. LED is flashing when the ME is registered to the GSM network and either awake or in power saving state.

BLUE LED mode (UMTS)	Function
Double Flashing	Connected to an ISP

Flashing	LED flashes when the ME is registered to the UMTS network and either awake or in power saving state. While the STATUS1 signal is active the STATUS0 signal is inactive.
Off	ME is not registered to the UMTS network.
YELLOW LED mode	**Function**
Flashing	Busy with communication with the Module.
0.5s On / 0.5s Off	Waiting for answer from the Module.
On	When connected to an ISP and a Socket is established.
GREEN LED mode (GSM)	**Function**
Double Flashing	Connected to an ISP
500ms On / 500ms Off	Flashes at 1Hz and 50% duty cycle when the ME is awake and not registered to any network.
2s On / 2s Off	Flashes at 0.25 Hz and appr. 50% duty cycle when the ME is in power saving state and not registered to any network. When the ME is in power saving state and not registered, the flashing frequency may be less than 0.25Hz and the duty cycle may vary, for example between 45% and 55%. These variations are due to transitions from awake state to power saving state which may occur at the beginning of an LED flashing period (eg. at the beginning of a 1Hz or 0.25Hz flashing period). In the worst case, the LED will indicate a transition from awake to power saving after 4s.
Flashing	LED flashes when the ME is registered to the GSM network and either awake or in power saving state. While the STATUS0 signal is active the STATUS1 signal is inactive.
Off	ME is not registered to the GSM network.

Table 1. LED functions.

25.29.3 I/O Connector pins

25.30.3 Each I/O Connector pin is protected by a RC coupling that is displayed in the figure below.

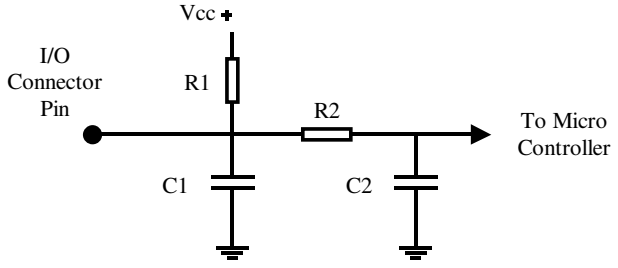


Figure 4. Protection of I/O Connector pins.

25.31.3 All pins have the same protecting circuit, weather they are used for digital or analogue signals, or programmed as input or output.

Item	Value
R1	1 MΩ
R2	33 KΩ
C1	4,7nF
C2	0,1uF

Table 2. Item values for protection of I/O Connectors.

25.32.3 The 7 input and output pins of the I/O Connectors of the wireless modem are individually configured. A pin can either be an input or output. Some of the pins have special capabilities as outlined in the table below. The ADC is only used if the port pin is programmed to select the Analogue input function, i.e. not the normal function, which implies the I/O function of a port pin.

25.33.3 RJ45 – I/O connector

I/O Pin	Function
1	I/O Pin 1, Digital I/O ,Interrupt(S0 counting)
2	IO2 (I/O8) - Digital IO / Pulse Counting(I/O8)
3	I/O3 (I/O9) - Digital IO / Pulse Counting(I/O9) , Analogue In
4	I/O Pin 4, Digital I/O, Analogue Input
5	I/O Pin 5, Digital I/O, Analogue Input
6	I/O Pin 6, Digital I/O, Analogue Input
7	I/O Pin 7, Digital I/O, Analogue Input
8	GND

25.34.3 Hardware Characteristics

25.35.3 The table below lists the hardware characteristics of the wireless modem.

Item	Value
Board size	100 x 50 x 20 mm
Case size	105 x 56 x 25 mm
Weight:	100g
Micro Controller:	Texas MSP 430F149
Volatile Data Memory (RAM):	2K Bytes
Flash EEPROM	60K Bytes
Serial EEPROM	32K Bytes
Programmable I/O Connector Pins:	Pin I/O1: Pulse Count, Digital I/O.

	Pin I/O2: Pulse Count, Digital I/O. Pin I/O3: Pulse Count, Analogue In/Digital I/O. Pin I/O4: Analogue In/Digital I/O. Pin I/O5: Analogue In/Digital I/O. Pin I/O6: Analogue In/Digital I/O. Pin I/O7: Analogue In/Digital I/O. Pin I/O2 and 3 are named I/O8 and 9, respectively, when using Pulse counting in the logging tab - Max sampling rate: 90 hz - Pull-up power on inputs. - A/D converter: 12-bit - Input Power Supply Voltage Monitor
Serial Devices	1 USART: full duplex
GSM/GPRS Engine	Cinterion EU3-P UMTS/HSDPA: Triple band, 850//1900/2100MHz GSM/GPRS/EDGE: Quad band, 850/900/1800/1900MHz Power Class Class 4 (+33dBm ±2dB) for EGSM900 Class 1 (+30dBm ±2dB) for GSM1800 Class E2 (+27dBm ± 3dB) for GSM 900 8-PSK Class E2 (+26dBm +3 /-4dB) for GSM 1800 8-PSK Class 3 (+24dBm +1/-3dB) for UMTS 2100, WCDMA FDD BdI Class 3 (+24dBm +1/-3dB) for UMTS 900,WCDMA FDD BdVIII Class 3 (+24dBm +1/-3dB) for UMTS 850, WCDMA FDD BdV
Power Supply Voltage input	+5 V to +35 V
Max Voltage applied to any I/O pin (Referenced to GND)	+50 V
Transmitting Typical consumption @ 12V:	9910-1: < 250ma 9570-1: < 200ma
Idle Typical consumption @ 12V:	9910-1:< 35ma 9570-1: < 30ma
Sleeping Typical consumption @ 12V:	9910-1: < 0.7ma 9570-1: < 0.7ma